

LAKES AND COORONG FISHERY

MSC PUBLIC COMMENT DRAFT REPORT

Prepared for:

Southern Fishermen's Association

DATE OF FIELD AUDIT

22/03/13

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Glossary of Acronyms

AFMA	Australia Fisheries Management Authority
B _{MSY}	Biomass at Maximum Sustainable Yield
CAB	Conformity Assessment Body
CDRs	Catch and Disposal Records
CLLMM	Coorong, Lower Lakes, and Murray Mouth
CoC	Chain of Custody
CPUE	Catch Per Unit Effort
CR	Certification Requirements (Marine Stewardship Council)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DENWR	Department of Environment, Water and Natural Resources
DEH	Australian Government Department of the Environment and Heritage
EPBC	Environment Protection and Biodiversity Conservation
ERA	Environmental Risk Assessment
ESD	Ecologically Sustainable Development
ETP	Endangered, Threatened, or Protected
FL	Fork Length
FMA	Fisheries Management Act
FRDC	Fisheries Research and Development Corporation
GPHA	Goolwa Pipi Harvesters' Association
HIMI	Heard Island and McDonald Islands
IFMC	Inland Fishery Management Committee
ILUA	Indigenous Land Use Agreements
IPI	Inseparable or Practically Inseparable
ISO	International Organization for Standardization
ITQ	Individual Transfer Quota
IUCN	International Union for Conservation of Nature
IWG	Implementation Working Group
LCCC	Lakes and Coorong Consultative committee
LCF	Lakes and Coorong Fishery
LTL	Low Trophic Level
MCS	Monitoring, control and surveillance
MDBA	Murray Darling Basin Authority
MSC	Marine Stewardship Council
NSW	New South Wales
NZ	New Zealand
PCR	Public Comment Report
P1, P2, P3	Principle 1, 2, 3
PI	Performance Indicator
PIRSA	(department of) Primary Industries and Regions in South Australia
RBF	Risk-Based Framework
SA	South Australia
SARDI	South Australian Research and Development Institute
SARFAC	South Australian Recreational Fisheries Advisory Council
SCS	SCS Global Services
SFA	Southern Fishermen's Association
SG 60, 80, 100	Scoring Guidepost 60, 80, 100
TACC	Total Allowable Commercial Catch

TL Total Length
TLM The Living Murray

1 Executive Summary

SCS Global Services (SCS) is an independent third party certification body that has undertaken the MSC assessment of the Lakes and Coorong Fishery in accordance with the MSC Principles and Criteria for sustainable fishing. The assessment complies with the MSC Certification Requirements v1.3 (January 2013) and the guidance to the Certification Requirements v1.3 (January 2013).

The team selected to undertake the assessment includes four team members that collectively meet the requirements for MSC assessment teams. These are:

- Dr. Sabine Daume, SCS Team Leader
- Mr. Sandy Morison, Principle 1 Expert
- Dr. Trevor Ward, Principle 2 Expert, and
- Ms. Mary Lack, Principle 3 Expert

The team met with fishery representatives, scientists and stakeholders in and around Adelaide, South Australia on March 20th-22nd, 2013. Documents were presented by fishery representatives and fisheries scientists. Client representatives were thorough in their approach and provided the assessment team with supporting documents. Original announcements for the fishery re-assessment indicated that the Risk based framework (RBF) may need to be used, however meetings onsite revealed information that was previously not available and therefore made the use of the RBF unnecessary. The re-assessment proceeded without the RBF.

In this report we provide the rationales for all scores proposed, we give details on why the finfish species () do not achieve an average score of above 80 under Principle 1 (Stock status and Harvest strategy) of the MSC Standard and therefore are not recommended for certification if the score under Principle 1 does not improve.

For pipi () the average score is above 80 under Principle 1 and therefore certification is recommended by the assessment team for this species.

We also provide the detailed rationales for all other Performance Indicators under Principle 2 (Ecosystem Impact) and 3 (Governance, Policy and Management system) and for the indicators under Principle 1 with pipi as the target species. Average scores for all Principles are over 80 for pipi (for more details see Table 6.1).

We are aware that the South Australian fishery management agency is in the process of developing improved harvest control rules for the finfish species, funding has been approved and the project has started. It is expected that the new, improved harvest control rules will be available in draft form in April 2014. The Fisheries Council is due to meet in early July 2014 to consider the harvest strategies in the draft management plan. Therefore the conditions related to the “Development of improved harvest control rules for the finfish species” are written as pre-conditions, with anticipated higher than 60 scores for performance indicator 1.2.2 when the harvest control rules are available in draft form.

Please note that the scores presented below are in *draft* and may change. No score is final until the final certification report with the certification decision is released.

There are several aspects of the fishery that are well suited for MSC certification. These are:

- Very low impacts to the habitat by the fishing gear
- Small amount of bycatch
- Small amount of other retained species
- A bottom-up approach to fisheries management with regular meetings between stakeholders and cooperative associations

Required content - remaining to be inserted:

- a. The determination / draft determination reached with supporting rationale.
- b. Any conditions attached to the certification and the time-scale for compliance.

2 Authorship and Peer Reviewers

Assessment Team:

A new assessment team was introduced for the re-assessment of the fishery. One team member (Dr. Ward) was also involved in the original assessment of the fishery in 2008, and both Dr. Ward and Dr. Daume have been team members of the fisheries surveillance team since that time. As outlined below, the assessment team meet the requirements in the Certification Requirements v 1.3 (2013). Team members are clearly experienced and comparably qualified to the original assessment team.

Dr. Sabine Daume – SCS Global Services (SCS)

Dr. Daume is responsible for leading SCS's Sustainable Seafood Certification program, which includes both fishery and chain of custody certification under the auspices of the Marine Stewardship Council (MSC), using the MSC methodology and standards. Dr. Daume is a marine biologist with special expertise in the biology and ecology of exploited marine resources. She has led surveillance audits and assessment of several fisheries including several fisheries in Australia. Dr. Daume has been trained by the MSC to use the Risk Based Framework (RBF) of the new Fisheries Assessment Methodology for data deficient fisheries. In addition, she is a certified lead auditor under the International Standard Organization (ISO) 90011:2008. Dr. Daume has over 13 years of professional experience working closely with the fishing and aquaculture industry in Australia. She holds a PhD in marine biology and an MSc in Marine Biology and Marine Chemistry. Prior to joining SCS Dr. Daume worked as a Senior Research Scientist at the Research Division of the Department of Fisheries in Western Australia. She also has experience working with diverse groups, often in remote marine environments. She has worked with industry personnel at all levels (divers, technicians, managers, executive officers) as well as policy makers and managers in government departments. Dr. Daume led the re-assessment of the HIMI Icefish fishery as well as the Western Australian Rock Lobster fishery and the US Halibut and Sablefish fisheries. She has been team members of the fisheries surveillance team ever since.

Mr. Alexander "Sandy" Morison – Morison Aquatic Sciences

Mr. Morison is a consultant specializing in fisheries and aquatic sciences. He has over 30 years' experience in fishery science and assessment at state, national and international levels and has held senior research positions for state and national organizations in Australia. He is currently chair of the Ecologically Related Species Working Group of the Commission for the Conservation of Southern Bluefin Tuna and is also contracted by the Australian Fisheries Management Authority to chair the South East Scaefish and Shark Fishery Resource Assessment Group, and the Slope Fisheries

Resource Assessment Group. He has also chaired a wide range of other fishery assessment groups and has experience with invertebrate, chondrichthyan and teleost fisheries. These include commercial and recreational fisheries in freshwater, estuarine and marine habitats and fisheries operating in tropical, temperate and polar environments. Sandy has also worked on ecological risk assessments for fisheries and assessments of vulnerability to climate change. He has particular expertise with fish age and growth and has been involved in the development and implementation of harvest strategies for several fisheries. Mr. Morison has participated as part of a team undertaking MSC pre-assessments for Australian Commonwealth-managed fisheries and has been the Principle 1 expert for the re-assessment of the Heard Island and McDonald Islands (HIMI) Icefish fishery as well as full assessments of the HIMI and Macquarie Island toothfish fisheries. Mr. Morison has been trained to use the RBF during the MSC training in Perth, Australia. He has over 20 publications in peer-reviewed scientific journals (8 as senior author), 8 book chapters, and over 100 project reports, technical reports, client reports and papers in workshop and conference proceedings.

Dr. Trevor Ward - Greenward Consulting

Dr. Trevor Ward is an independent marine ecologist specialising in monitoring, evaluation and reporting systems for marine ecosystems and biodiversity. Dr. Ward provides strategic policy and technical advice to government agencies, fisheries managers, conservation groups and local communities worldwide on the conservation and sustainable management of marine ecosystems and fisheries. He has published more than 140 scientific journal papers, book chapters and research reports in marine ecology and environmental management. In 1996 he was jointly awarded the CSIRO Australia Chairman's Medal for excellence in marine science. In addition to his consulting practice he currently holds the appointment of adjunct professor at University of Technology Sydney, and is a recent member of state and national-level government advisory panels for marine parks, state of the environment reporting and national biodiversity research priorities. Dr. Ward has published extensively on the sustainability assessment of fisheries and aquaculture systems, including journal papers, book chapters, and two university-level text books. Dr. Ward has been a Principal 2 assessor for many of the currently MSC certified fisheries in Australia and New Zealand, including the original Lakes and Coorong Fishery assessment under the MSC standard. Dr. Ward has been trained to use the RBF during the MSC training in Perth, Australia.

Ms. Mary Lack - Shellack Pty Ltd.

Ms. Lack has qualifications in agricultural and resource economics and has over 25 years' experience in Australian and international fisheries management. She has been Director of Shellack Pty. Ltd., a consulting company, based in Canberra, Australia, specializing in fisheries management and trade and working with government, non-government and intergovernmental organizations for the past 10 years. Prior to her work with Shellack Pty Ltd., Ms. Lack worked in various senior fisheries management roles in the Australian Government. During that time she has developed strong skills in fisheries management, domestic and international fisheries governance and fisheries trade analysis. In recent years her work has focused on sustainability and governance issues in Australian fisheries and in regional fisheries management organizations. Mary has extensive relevant experience with MSC methodology, particularly in the Australian-Antarctic region. She has been involved in pre-assessments, annual surveillances and re-assessments under the MSC standard.

Peer Reviewers:

Associate Professor Caleb Gardner, Director SMRCA, Institute of Marine & Antarctic Studies, University of Tasmania, Australia

A/Prof Gardner is director of collaborative research activities between the University of Tasmania and the Tasmanian State Government. This role involves supervision and resourcing of over 60 staff

and 38 PhD students operating across around 150 projects. Research is mainly on the larger marine industries of farmed Atlantic salmon and wild harvest blacklip abalone and southern rock lobster. However activities also span many other operations including recreational fisheries, scalefish, crabs, scallops and oyster culture. In addition to his role as Director SMRCA, he leads several research projects dealing with wild fisheries species, generally with the objective of improving harvest strategies. He also has a smaller role in leading research activities on wild harvest fisheries at the Australian Seafood Cooperative Research Centre. Projects in this organisation are mainly related to improving economic yield and reducing ecosystem impacts through better management. Projects involve partnerships between research organisations around Australia and industry organisations including western rock lobster, southern rock lobster, abalone, finfish and prawn fisheries.

Dr. Joe DeAlteris — Rhode Island University, Professor Emeritus

Dr. DeAlteris has an international reputation as an expert in the field of stock assessment and fishing gear technology. He brings intimate knowledge of invertebrate fisheries and has considerable experience in MSC fishery evaluations. Dr. DeAlteris has worked with SCS on the full assessment of the Louisiana blue crab and Atlantic red crab fisheries, the re-assessment of British Columbia halibut fishery, and annual audits of Dungeness crab, red crab blue crab, Canadian haddock and the shrimp fisheries. He has also conducted pre-assessments, and assessment peer reviews. He has worked with other certifying bodies (CBs) conducting pre-assessments and assessment report reviews of finfish and invertebrate fisheries in the north Atlantic, Pacific, and Gulf of Mexico regions. He recently retired from the University of Rhode Island (URI) in May of 2012, and was awarded Professor Emeritus status. In 30 years of service to URI he is taught course work, conducted research, and developed outreach programs in fisheries conservation engineering, fish population dynamics and quantitative ecology, and shellfish aquaculture. He mentored more than 40 graduate students completing MS and PhD degrees. He has served on numerous government committees including the National Research Council. He has had more than 35 publications in peer-reviewed journals, and his 2010 paper co-authored a paper with a former graduate student entitled: “A simulation study of the effects of spatially complex population structure on Gulf of Maine cod” was selected as the best paper of the year by the American Fisheries Society in the North American Journal of Fisheries Management. He has also authored and co-authored numerous books, manuals, non-referred articles, and technical reports in the fields of fisheries biology, stock assessment and fishing gear technology.

3 Description of the Fishery

3.1 Unit(s) of Certification and Scope of Certification Sought

The fishery is within scope of the MSC certification. The fishery was first certified in 2008 and no changes have been made to the units of certification (Table 1). The Lakes and Coorong Fishery is a small fishery with 36 license holders currently in operation (see Appendix 6 for full list of license holders). The client for this fishery, the Southern Fishermen’s Association, has 28 license holders, an additional 8 are part of the Goolwa Pipi Association for the Lakes and Coorong Fishery targeting from 1 to 4 of the certified species using a variety of different nets (gill, drum or hauling) and/ or rakes for Papis (Table 1 below). All license holders listed in appendix 6 of this report are eligible to share the certificate.

Table 1: Units of certification

Units of Certification	
Species	Pipi (<i>Donax deltoides</i>), Golden Perch (callop) (<i>Macquaria ambigua</i>), Mulloway (<i>Argyrosomus hololepidotus</i>), Yellow-Eyed Mullet (<i>Aldrichetta forsteri</i>).
Geographical Area	Lakes and Coorong in South Australia
Methods of capture	Net (gill, drum, hauling) and rake
Management System	Input controls: limited entry, gear restrictions, Output controls: TACC for Pipi (<i>Donax deltoides</i>),
Client Group	Southern Fisherman's Association

3.2 Overview of the Fishery

The lower Murray Lakes and Coorong region has been important to Aboriginal people throughout the entire period of their habitation of Australia. Ngarrindjeri people still practice traditional fishing and food gathering in the Lakes and Coorong region. Camp Coorong also engages in cultural and traditional fishing for educational purposes. The State is currently engaged in negotiations with native title claimant representative bodies and the commercial fishing industry in relation to resolving native title claims through negotiated agreements. Both the Act review process and the agreement negotiation process will inform the way that access to fisheries resources by Aboriginal communities is defined and implemented in the Lakes and Coorong Fishery.

Fishing enterprises have been carried out in the lower Murray Lakes and Coorong region since early European settlement and have been documented from as early as 1846. During this early period of development, the fishery was characterized by artisanal and subsistence operations, with most fishers operating on a seasonal basis. As commercial fishing developed in the region, Goolwa and Milang served as bases for commercial fish landings. Fresh and preserved fish were consigned for sale at the Adelaide fish markets. The main species taken from the region during this development period were Mulloway, Bream, Yellow-eye Mullet, Australian Salmon and Australian Herring (Olsen, 1991).

Fishing equipment used included locally built, naturally aspirated wooden vessels, set lines and various net designs with different lengths and mesh sizes, all constructed from natural fibers (Olsen, 1991). In 1896, there were approximately 30 full time commercial fishers operating in the Lakes and

Coorong region, based mainly at Goolwa and Milang. The South Australian Government introduced a requirement in 1906 for all commercial fishers to hold a commercial fishing license. In 1915, there were 15 licensed commercial fishers operating in the Lakes and Coorong region, however, the number of unlicensed fishers may have been significantly greater at times, particularly during the depression years and when the steamer trade through Goolwa slowed due to low river flows.

In 1940, following barrage construction in the Coorong, there were 64 fishing licenses issued in the lakes and Coorong region. This number dropped to 13 by 1970, evidently due to military enlistments and regulations on the number of additional agents (persons assisting fishing operations) permitted. Following this, records indicate that the number of licensed commercial fishers in the fishery rose to a maximum of 106 fishers in 1972 (Olsen, 1991), before being substantially reduced with the introduction of new licensing criteria.

There are currently 36 licences issued to fish in the Lakes and Coorong Fishery. Day to day management of the fishery is managed by the South Australian Department of Primary Industries

and Regions. The Southern Fishermen's Association and the Goolwa Pigi Harvesters Association are the industry bodies involved in management of the fishery.

Although modern technologies and materials (such as motor powered aluminium fishing vessels and synthetic fibres used to construct fishing nets) have been adopted, changes to fundamental fishing practices have been relatively superficial, when compared to the advances made in many other commercial fisheries. This reflects the unique characteristics of the Lakes and Coorong region and a desire from the commercial industry and Government to contain effective fishing effort levels within historical and sustainable limits.

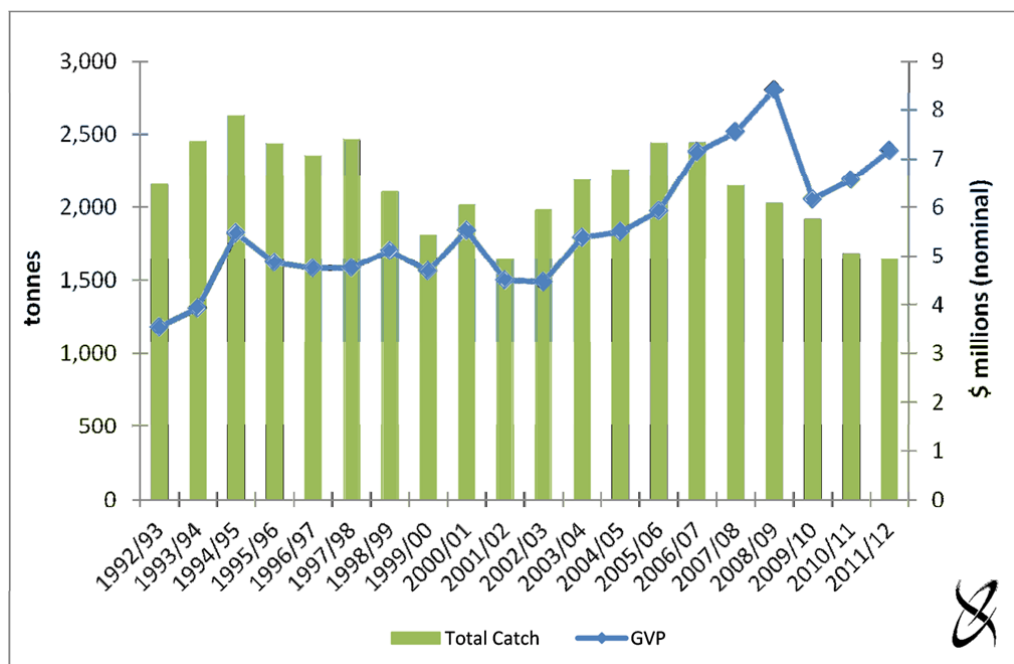
Production from the estuarine component remains dominated by Mulloway, Black Bream, Yellow-eye Mullet and occasional marine species as well as Pigi. Mulloway harvest data demonstrates the over-riding impact of habitat loss on this valued native fish when the system of barrages converted large areas from estuarine to freshwater conditions. Some freshwater species such as Golden Perch, Bony Bream and carp have benefited from this creation of larger areas of freshwater habitat in the lower lakes. Consequently production from the freshwater region is dominated in unit-value by native Golden Perch and in abundance by Carp and Bony Bream.

Fish recruitment levels in the Lakes and Coorong Fishery are primarily driven by variation in fresh water flows, and environmental conditions, in particular the frequency of flooding and the extent of drought periods (Pierce and Doonan, 1999). As such, the biological productivity of most major fish species and the economic productivity of the fishery will continue to fluctuate in line with variations in environmental conditions such as freshwater outflows (regulated both naturally and artificially).

The level of effort directed at different species, and hence the species composition of the catch, has fluctuated in part in response to these changes in environmental conditions. When conditions favour the freshwater species, more effort is directed at them; when conditions favour estuarine or marine species, they become the main target of fishing. Fishers describe these changes as being a system of rotational harvest that provides a level of precaution against overfishing by shifting effort away from species whose abundance has temporarily declined. This system is unstructured and voluntary but economic pressures on each fishing business act to direct fishing effort towards species that are more abundant.

Changes in markets and the price of species also drive shifts in effort as shown by the increase in the pigi harvest in response to the increased value obtained for this species. The value of the pigi catch has increased from less than \$0.8 million in the late 1990s to over \$2.1 million and over 40% of the total value of the fishery in 2010/11 (Knight and Tsolos, 2012).

Carp became a dominant fish species in this man-modified system after their illegal release into the Murray catchment circa 1970. They have been an important component of the Lakes and Coorong fishery but represented less than 6% of the value of the fishery in 2010/11 (Knight and Tsolos, 2012). For a considerable period post-impoundment, yabby production continued at high levels meeting both local and international market demands. However, this fishery has subsequently virtually disappeared leaving little evidence as to the cause of its demise.



Source: Econsearch, 2013

Principle One: Target Species Background

3.2.1 LCF Harvest Strategy

All LCF species except for pipi are managed under a generic harvest strategy framework with species specific reference points that are described in the LCF Management Plan (Sloan, 2005). Pipi is subject to a separate harvest strategy. The commercial catch and CPUE biological reference points have been defined using:

- Historical commercial catch and effort data collected over a reference period (1984/85 to 2001/02 – financial year);
- A reference range (upper and lower limits) for selected key performance indicators (both at the fishery-wide level and for individual key species); and
- A reference rate of change (rate of increase or decrease) for selected key fishery performance indicators, to measure trends over a three to four year period depending on the species.

The reference period (1984 to 2001) was selected for the following reasons:

- Reliable commercial catch and effort data are available for the fishery during this period;
- The commercial fishery had stabilised after experiencing an extended period of drought, which resulted in Murray Mouth closure in 1981;
- There was relative stability in the management arrangements and commercial licence numbers following the introduction of the Scheme of Management in 1984; and
- It was representative of fishery performance over the recent history of the fishery (Sloan, 2005).

In addition to the above, other generic performance indicators and reference points related to each of the management objectives are listed in the Management Plan but only the primary biological indicators are used in the annual stock status report.

The management plan specifies that when annual estimates of one or more performance indicators suggest that the fishery is performing outside of the reference range established in the Management Plan (i.e. if a reference point is breached), PIRSA Fisheries and the Fisheries Management Committee¹ will take the following actions:

1. Notify the Minister for Agriculture, Food and Fisheries and participants in the fishery as appropriate;
2. Undertake a detailed review including an examination of the causes and implications for all key species of reaching one or more reference values;
3. Consult with key stakeholder groups regarding the need for alternative management strategies for each sector, which may include changes or improvements to:
 - Limitations on total effort levels;
 - The type and amount of fishing gear that may be used;
 - The design of fishing gear (e.g. mesh sizes or configurations);
 - Temporal and spatial closures;
 - Moratoria on the take of individual species;
 - Size limits for individual species;
 - Recreational bag and boat limits and possession limits;
 - Limits on the total catch of an individual species (output controls);
 - Limitations on the number of participants; and
 - Processes that influence environmental performance.
4. Provide a report to the Minister, within three months of the initial notification, on the effects of reaching one or more limit reference values, including any recommendations on alternative management strategies.

The strategy notes that, given the highly dynamic nature of the Lakes and Coorong Fishery, the inherent uncertainty in assessment processes and the range of external factors that can influence assessment outcomes, this non-prescriptive approach to management review and response is considered appropriate, and that the implementation of a management review does not mean that management arrangements will automatically be altered.

Information was provided to the assessment team in December 2013 that an error had been detected in the methods used to calculate targeted fishing effort for finfish species caught in the Lakes and Coorong Fishery from 2005 to 2013. Annual targeted effort was over-estimated which resulted in under-estimated annual CPUE. This also affected the upper and lower reference limits for CPUE of those species in the Lakes and Coorong Management Plan. It was noted that no management decisions had been based on these estimates of CPUE. Because these errors had affected both the calculated biological reference points and the indicators, the frequency with which indicators would have breached the reference point ranges would have been unaffected. The original values used in reports are therefore used in this report.

¹ Under the new FMA (2007) this committee no longer exists (see Section 3.5)

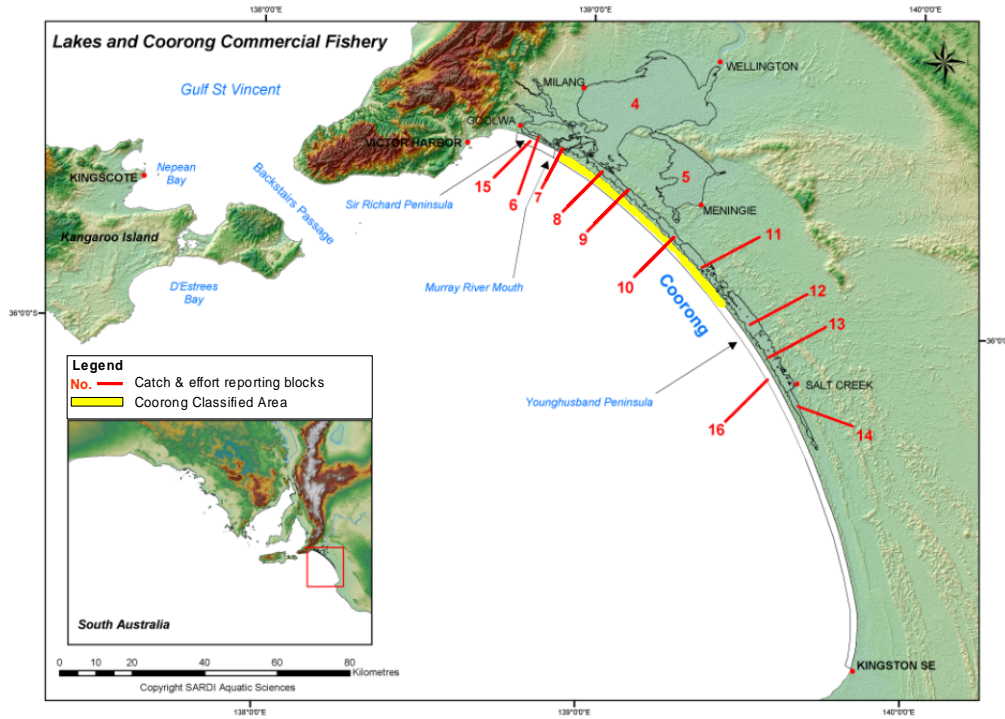


Figure 1. The lower Murray, Lakes and Coorong region, South Australia (from Sloan, 2005).

**3.2.2 Pipi (*Donax deltoides*)
Distribution and Stock Structure**

Pipi are found on surf beaches from southern Queensland to the Eyre Peninsula in South Australia (Kailola et al., 1993).

The stock structure of pipi populations in Australia is not well known. No genetic differences were found over a 1200 km stretch of coast on the east coast of Australia suggesting a single genetic stock in this area (Murray-Jones and Ayre, 1997). No genetic studies of the population on Coorong beaches have been done, but different ocean current systems mean it is likely to be a different genetic stock from that of the east coast population (Ferguson and Mayfield, 2006).

Genetic homogeneity, however, is not a strong indication of stock structure from a fishery management perspective. The Coorong population is considered to be the largest on the coast of South Australia and observed impacts of fishing on this population have been taken to indicate that, for the purposes of fishery management, this population is discrete and separate from others along southern Australia.

For the purposes of management, the Coorong population of pipi is managed as a self-recruiting population distinct from other stocks distributed throughout other South Australian ocean beaches (Sloan, 2005). This is a conservative assumption from the perspective of stock management.

Biology

In South Australia, pipi are found in the surf zone. Spawning takes place mainly in September and October. They reach maturity at about 13 months of age when more than 36 mm in shell length and reach a maximum length of more than 60 mm at 3 to 3.5 years of age. Pipi live for 4-5 years and growth varies with season and age (Kailola et al., 1993). Large natural fluctuations in abundance are a feature of surf clam populations worldwide and are a characteristic of Pipi populations in both New South Wales and South Australia (Ferguson and Mayfield 2006). Continuous recruitment of juveniles has been found in studies of Australian Pipi populations and larval supply is not thought to be limiting (Ferguson and Mayfield 2006).

The Fishery

The main commercial fishery for Pipi in South Australia operates on the ocean beach of the Youngusband Peninsula, adjacent to the Coorong, but small quantities are also harvested from other beaches on the Fleurieu Peninsula (Ward et al., 2010). Commercial fishers use cockle rakes (with nets attached) to manually harvest the shellfish from intertidal areas. No mechanised harvesting methods are permitted. Commercial catch and effort levels have increased substantially since the early 1980s, due mainly to increased demand for cockles associated with the development of a market for human consumption (Table 3, Figure 2). Goolwa cockles have become the most important species in the Lakes and Coorong Fishery, in terms of both production and value.

The commercial catch of Pipis in 2010/11 was at the lowest level since records were first collected (Table 3). The catch in the last three years has been constrained by the Total Allowable Commercial Catch (TACC) (Figure 2). The commercial catch of Pipis is almost exclusively taken by fishers in the LCF. In 2010/11 296 t of the 299 t were harvested by LCF fishers with the remaining 3 t taken in the Marine Scalefish Fishery (Knight and Tsolos, 2012). Pipi harvesting is also permitted by holders of a Rock Lobster Fishery licence (Ward et al., 2010) but there was no reported catch by this sector in 2010/11.

The commercial fishery is managed using a range of measures but total harvest is now restricted by an annual TACC and Individual Transferable Quotas (ITQs). Regulations establishing these measures were first introduced in December 2007 and although these were subsequently disallowed by the Legislative Council in June 2008, catches continued to be limited by Licence Conditions. Regulations re-establishing the TACC and ITQs were gazetted in October 2009. Other measures specified in the

Fisheries Management (Lakes and Coorong) Regulations 2009 include restricted entry, restrictions on the type and amount of gear, prior reporting of harvesting activities, and requirements for the transport and consignment of the catch. In addition, approximately 32% of the TACC was withheld for winter fishing in 2011/12 (Ferguson, 2012b).

Recreational fishers are also allowed to harvest Pipsis but a size limit (3.5 cm minimum shell width – close to the size at maturity), bag limit (300 per person per day east of 136° East, 100 per person per day west of 136° East), possession limit (a maximum of 1200 Pipsis may be held at any one time), area restrictions (recreational fishers are permitted to take pipi from a small section of the Coorong Beach, between 28 Mile Crossing and the Kingston SE jetty; recreational fishing for Pipsis is prohibited on the Youngusband Peninsula (Coorong Beach) between the Murray Mouth and 28 Mile Crossing), and a closed season (1 June to 31 October) apply. Recreational fishers are not permitted to sell or trade their catch. The most recent estimate of the recreational harvest of Pipsis in 2007/08, although very imprecise, was that it was 5 tonnes and was only 0.8% of the total harvest weight (Jones, 2009).

Table 2. Pipi value and production from all SA commercial fisheries by financial year from 1984/85 to 2010/11 (*Knight and Tsolos, 2012*)

Year	Value (\$A,000)	Production (000'kg)
1984/85	200	449
1985/86	n/a	n/a
1986/87	n/a	n/a
1987/88	250	308
1988/89	604	303
1989/90	320	302
1990/91	430	541
1991/92	724	771
1992/93	727	748
1993/94	700	843
1994/95	621	747
1995/96	780	927
1996/97	637	830
1997/98	636	1040
1998/99	952	976
1999/00	904	1085
2000/01	1193	1250
2001/02	1049	1085
2002/03	1373	1187
2003/04	1441	1073
2004/05	1351	1121
2005/06	1703	1062
2006/07	1941	994
2007/08	2044	607
2008/09	3237	470
2009/10	2969	301
2010/11	2221	299

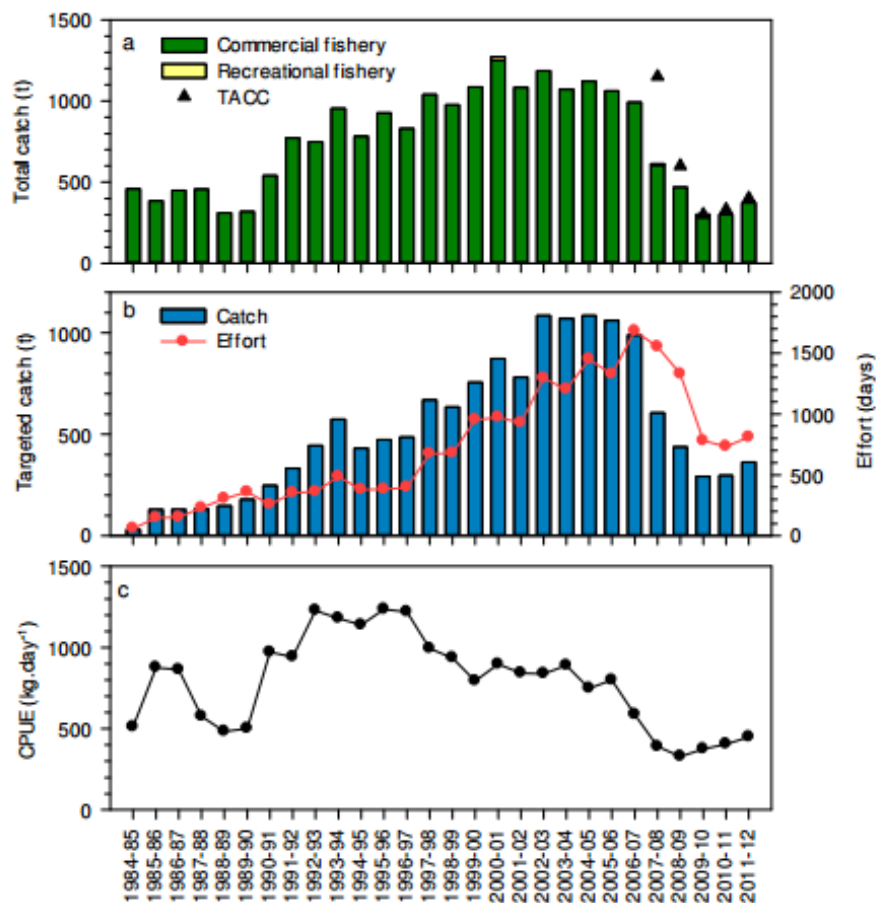


Figure 2. Annual levels of catch, effort and CPUE for pipi between 1984-85 and 2011-12 showing (a) total catch (MSF and LCF), and for the LCF (b) targeted catch, targeted effort, and (c) targeted CPUE. (Ferguson, 2012b).

Harvest Strategy

As indicated above, the performance indicators for the fishery that were set in the 2005 Management Plan were based on data from the fishery. Following the adoption of a TACC and ITQs for the fishery a new process was required for setting the annual TACC and monitoring the performance of the fishery. A new Harvest Strategy has been developed and, although it is still identified as a draft, the harvest control rules it contains are those used to set TACCs. Evidence for this is in the minutes of the Lakes and Coorong Consultative Committee meetings (Meeting #13 on 31 May 2012, Meeting #14 on 23 August 2012 and Meeting #16 on 21 February 2013) which indicate that this Harvest Strategy was used in setting the TACC for the 2012/13 fishing season and is intended to be used again for the 2013/14 season. This harvest strategy will formally become part of a new Fisheries Management Plan for the LCF that is currently being developed.

This draft Harvest Strategy has the following objectives:

- Promote stock recovery and maintain a target pipi relative biomass above 10 kg/4.5 m² and not less than 8 kg/4.5 m²
- Maximise Fishery Gross Margin

The figure of 8 kg/4.5 m² has been chosen to represent a conservative level of relative biomass that, based on the rebuilding trend observed since 2008-09 and the TACCs following the harvest strategy, would allow continued rebuilding of the Pipi stock. This value was based on the results of initial fishery-independent surveys conducted over three years from 2007/08 to 2009/10 that tracked the relative abundance of Pipis over three fishing seasons (Ward et al., 2010) (Figure 3). The value was apparently not analytically determined and is therefore to some extent an arbitrary choice, but the value selected is toward the upper range of relative biomasses observed over the period surveyed. The stock has demonstrated a capacity for strong recruitment and rebuilding from the low relative biomass levels recorded in 2008-09 and maintaining a relative abundance at the higher relative biomass levels of the TRP would provide additional precaution. The primary biological performance indicator for this fishery is fishery independent relative biomass of legal-sized pipi (kilograms per 4.5 m²) but the aim is to develop an additional indicator of relative abundance of pre-recruits.

This harvest strategy does not aim for an estimate of BMSY, a proxy for this or a specific proportion of unfished biomass. Given the natural fluctuations in the Pipi stock and the likelihood that the biomass could therefore fall below such measures for reasons that are unrelated to fishing pressure, such static targets would be inappropriate. The harvest strategy, however, does aim to maintain a highly productive stock and at a level well above the point at which recruitment might be impaired. These are important criteria in the MSC Certification Requirements.

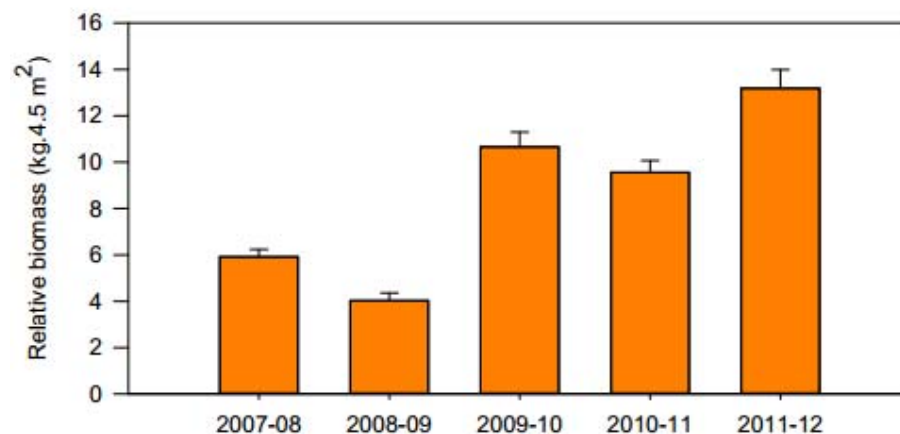


Figure 3. Relative biomass of pipi from fishery-independent sampling within the area of the LCF (SARDI, unpublished data).

The harvest strategy aims to achieve these objectives via the following strategies:

1. Promote rebuilding of the stock to historically sustainable levels by setting an appropriate annual TACC.
2. Sustainability of the pipi fishery
 - a. Provide management decisions responsive to changes in relative abundance of pipi (fishery independent catch rates) and the presence/absence of pre-recruits into the fishery
3. Improved business certainty and viability
 - a. Implement decision rules to provide greater certainty to the annual TACC decision making process for all stakeholders

- b. TACC is only altered in years when fishery conditions have significantly changed such as a substantial rise or fall in relative biomass (from fishery independent surveys)
- c. Encourage industry input into the decision making process when exceptional external factors arise

4. Profitability

- a. TACC to be set at a level that maximises returns for the fishery within biologically sustainable limits
- b. Higher catch rates supporting economic efficiency

Despite the lack of a publicly reported process for TACC setting, the outcomes of severe reductions in the TACC indicates a capacity for prompt and significant responses to adverse trends in indicators. Furthermore, the reported voluntary cessation of commercial fishing prior to a TACC being reached is evidence of a strong stewardship ethic within key components of the industry.

The target reference point is an average annual fishery independent relative biomass of legal-sized pipi is greater than or equal to 10 kg/4.5 m².

The limit reference point is an average annual fishery independent relative biomass of legal-sized pipi of 4 kg/4.5 m². If the relative biomass falls below this level, the fishery will be closed.

Performance measures for the second objective (Fishery Gross Margin, as a proxy for maximum economic yield) are yet to be developed.

The rules for determining changes to TACCs are specified in the Harvest Strategy and the extent of any change is contingent on the level of change (if any) in the relative biomass of legal-sized pipi, whether pre-recruits were present or not, and any expected changes in the Fishery Gross Margin. These decision rules for implementing the Harvest Strategy are also represented in the form of a Decision Table (Figure 4). The fishery independent relative biomass of legal-sized pipi from the previous season (x-axis) determines the following season's maximum TACC (y-axis) for the pipi fishery with incorporated economic information. The 'green' range indicates acceptable target levels of TACC for the biomass. The 'blue' range indicates TACCs that would be below target levels for the biomass, while the 'red' range indicates TACCs that would be above target levels for the biomass. There has, as yet, been no formal testing of this harvest strategy.

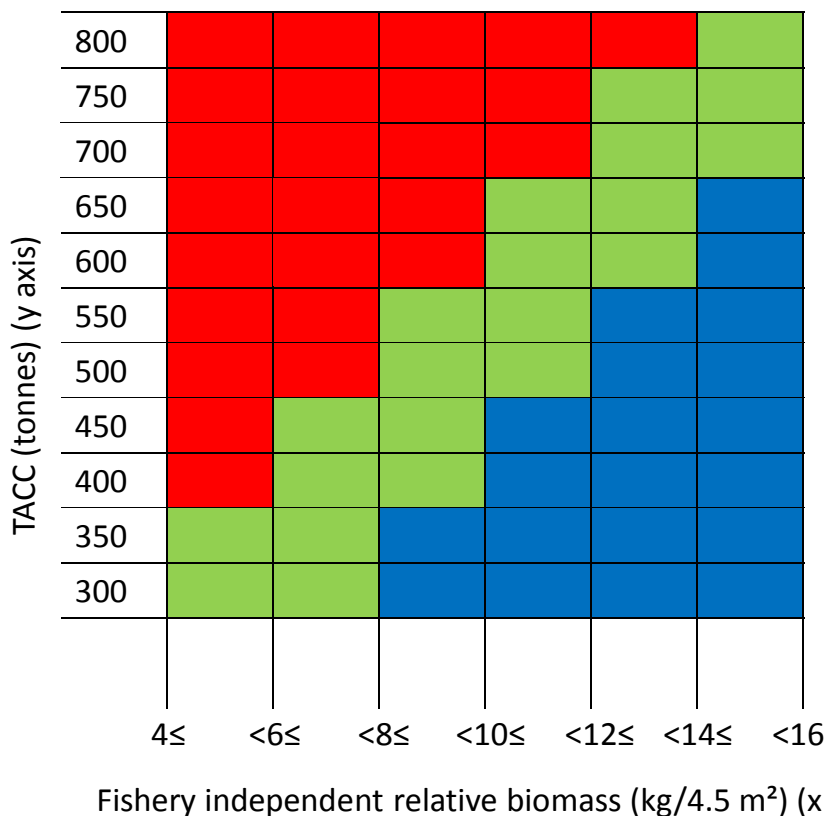


Figure 4. Decision rules table for the pipi harvest strategy.

Assessment

Although a TACC has been in effect for several years, the original performance indicators that had been specified, and were still reported on for the fishery up to 2010/11, are similar to those used for other species in the LCF as outlined in the 2005 Management Plan (Sloan, 2005). They include catch, CPUE (kg/fisher/day), 3-year total catch trend and 3-year CPUE trend (Ferguson, 2012b, Ferguson, 2012a). These indicators have been falling outside the specified ranges (Table 3) but have become less relevant to the management of the fishery following the change to a mainly output managed fishery.

The initial TACC that was set in 2007/08 was set at a level that was above recent catch levels and close to the maximum reported catch. It did not constrain catches. The following year the TACC was substantially reduced in response to concerns about the status of the stock which was considered to have become depleted. The catch of pipi, however, was still substantially less than the TACC in 2008/09 but this occurred partly because several large quota holders voluntarily ceased fishing during the last few months of the season (Ward et al., 2010). The TACC was further reduced in 2009/10 and has constrained the catch in each of the last three years. CPUE, which had declined to an all-time low in 2008/09, has also gradually increased since then (Figure 2). Commercial CPUE, however, is not regarded as a reliable index of stock abundance, particularly since markets for human consumption have developed which favour the harvesting of larger animals and also since the introduction of a TACC has changed fishing practices. The draft harvest strategy was developed during this period of rebuilding that followed the period of stock decline (PIRSA, 2012).

Early assessments of the status of pipi stocks relied on fishery dependent data but the need for a fishery-independent monitoring program was recognised and agreed by fishers, resource managers

and scientists in 2007 (Ward et al., 2010). This fishery-independent monitoring program has continued and the results have become increasingly important in the setting of the TACC.

The index of relative biomass provided by the fishery-independent survey is regarded as being more robust and has become the primary performance indicator proposed to be used in the draft harvest strategy for pipi (Ferguson, 2012b). The results of these annual surveys, although provided to managers and industry as part of the TACC setting process, have not been formally reported.

The surveys estimated that the relative biomass of pipi more than doubled between 2008/09 and 2009/10 and remained at a similar level in 2010/11 (SARDI, unpublished data) (Figure 3). The surveys also indicate that the relative biomass has changed within a fishing season and may either fall (as in 2007/08) or increase (as in 2009/10) (Figure 5). The relative biomass has also varied spatially over the 60 km of beach that is fished and was more restricted when the biomass was lower (Figure 6).

Data on changes in the size composition of the pipi population (Figure 7) show the recruitment of sub-legal size Papis to the population and how the proportion of these may vary spatially over the fishery. Similar variation in size composition was observed for the South Australian population of Papis in the 1970s (King 1985). These variations are thought to reflect the combined effects of inter-annual variation in the spatial distribution of fishing effort, recruitment and alongshore movement.

A comparison of the intra-annual trends in fishery-independent surveys for Pipi and commercial CPUE demonstrated that CPUE data from the commercial fishery as currently collected does not provide a robust index of the overall abundance of Pipi on the Youngusband Peninsula (Ward et al. 2010). Furthermore, the level of recruitment is an important and immediate determinant of the relative biomass so developing an index of abundance for sub-legal sized animals would improve the ability to predict fishable biomass.

Table 3. Performance indicators for pipi and reported levels for recent years. Values highlighted are below the lower reference point.

Performance indicator	Upper reference point	Lower reference point	Year				
			2007-08	2008-09	2009-10	2010-11	2011-12 ¹
Catch (t)	1500	800	607	469.7	300.5 ²	299.4 ²	374.3 ²
CPUE (kg. fisher day ⁻¹)	1200	850		330.4	374.8	410.6	449.5
3-year catch trend	226	-226		-261.9	-237.9	-85.2	-28.5
3-year CPUE trend	240	-240		-122.5	12.0	40.1	39.2

¹ Values for 2011-12, although reported, were not considered assessable against the performance indicators.

² Catches in the last 3 years have been constrained by the TACC.

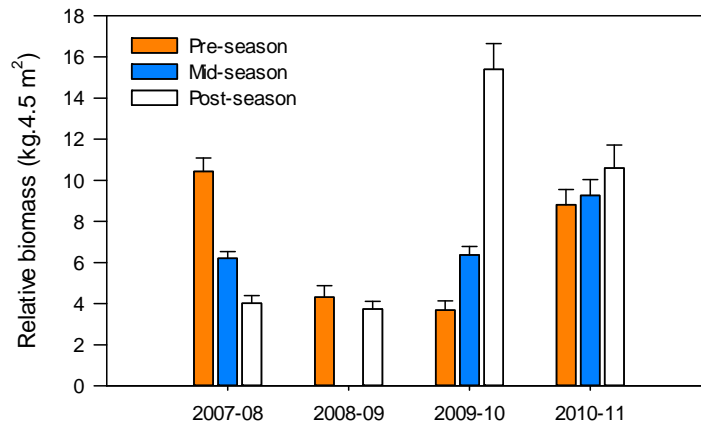


Figure 5. Relative biomass of piri from fishery-independent sampling at different times during the fishing season (SARDI, unpublished data).

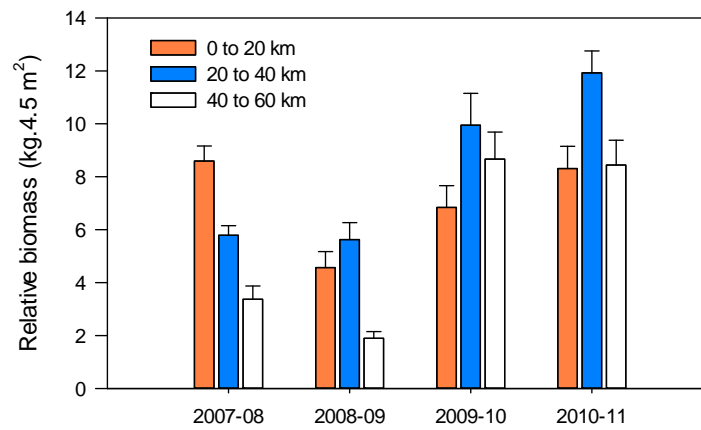


Figure 6. Relative biomass of piri in different segments of the fishery (SARDI, unpublished data)

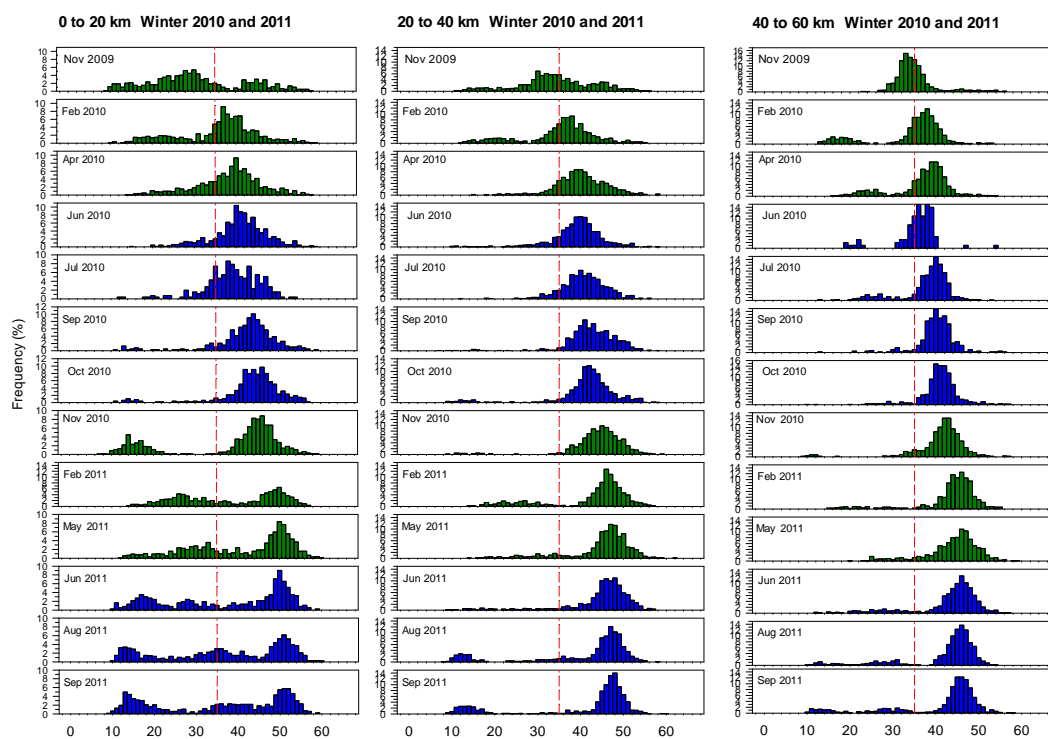


Figure 7. Length-frequency distributions of pipi from segments of the fishery (Nov 2009 to Sep 2011) (SARDI, unpublished data). (Red vertical line indicates the minimum legal shell size).

3.2.3 Mulloway (*Argyrosomus hololepidotus*)

The most recent stock assessment report for Mulloway (Ferguson and Ward, 2011) provides an overview of the species' biology, a description of the fishery and the latest information on stock status. Unless otherwise referenced, the following information on Mulloway is drawn from that source.

Distribution and Stock Structure

Mulloway is a member of the family Sciaenidae, which are commonly known as drums and croakers. They occur in estuarine and nearshore Pacific Ocean and Indian Ocean waters surrounding Australia, Africa, India, Pakistan, China, Korea and Japan (Silberschneider and Gray, 2008).

Mulloway in South Australia are managed as a self-recruiting population, with recruitment considered to be dependent upon local spawning within South Australian waters (Sloan, 2005).

A recent review considered that no definitive conclusions can be made regarding the population structure of the species (Silberschneider and Gray, 2008). Recent research on stock structure within South Australian waters, however, concluded that Mulloway in western and south-eastern South Australia comprise separate populations based on differences in elemental composition and shape of otoliths and differences in growth rates (Ferguson and Ward, 2011, Ferguson et al., 2011).

The relationship between the populations of Mulloway found in south-eastern South Australia and western Victorian waters remains uncertain. Tagged fish have been reported to have moved between the estuaries of the Glenelg River in western Victoria and the Murray River and back but the frequency and significance of such movements is unknown. Mulloway caught for this tagging work were sub-adults (50-80 cm TL) (J Lieschke, DSE Victoria personal communication) which is consistent with the sizes of fish caught by recreational anglers from this area (Conron et al., 2012).

The observed movements to South Australia may indicate a return to the main spawning area in South Australia by fish that are reaching maturity.

Biology

Size at 50% maturity for Mulloway is at 81 cm (TL) which is reached by females in 6 years and males in 5 years. Mulloway in eastern South Australia spawn between October and January with a peak in November. Spawning aggregations have been reported near the mouth of the Murray River and it is believed that spawning occurs near the river mouth. Juveniles enter the estuary shortly afterward.

Recruitment success of Mulloway has been linked to river flow (Ferguson et al., 2008) and this relationship is thought to enhance recruitment of juveniles to protected estuarine habitat. Juvenile Mulloway show a preference for turbid estuaries with relatively high freshwater input in southern and south-eastern Australia. The remnant estuary of the Murray River is thought to provide important habitat for juvenile Mulloway (up to 5 years old) and that the population centered about the Murray River system is estuarine dependent. The Murray River estuary may be particularly important habitat for Mulloway because it is the largest area of protected estuarine habitat in southern Australia. A schematic representation of the life history of Mulloway is shown in Figure 8.

Juvenile Mulloway (less than 6 years old) in the Murray River estuary are spatially segregated from reproductively mature adults which have only been found in the nearshore marine environment.

Mulloway have been recorded up to 41 years of age in South Australia and a maximum size of approximately 1.8 m but the age compositions of the catches from nearshore marine habitats by both the commercial swinger net fishery and the recreational line fishery show few animals older than 16 years. This truncation of the age distribution has been regarded as an effect of relatively high fishing pressure (Ferguson and Ward, 2011).

Mulloway are an apex predator. Smaller juveniles (150 – 460 mm TL) from the Murray River estuary were found to feed on small fish, especially Hardyheads and Bony Bream (44%), shrimp (13%) nematodes (14%) and amphipods (8%) (Hall, 1986). This is similar to their diet reported from other Australian estuaries where Mulloway have been reported to shift from eating mainly mysid shrimp when less than 250 mm TL, to prawns (150 – 600 mm TL), and then to fish (> 500 mm TL) and for their diet to reflect the food available in the local environment (Gray and McDonall, 1993). Lakes and Coorong fishers also reported that their diet was very variable seasonally, spatially and with river flow, that Bony Bream and Yellow-eye Mullet were an important component of the diet at times, and that Shore Crabs, Surf Crabs, Mysids (in small Mulloway) and Eels (in large Mulloway) are also eaten.

Fishery

Mulloway have been harvested from the Coorong estuary since early European settlement and the first regulations were implemented in 1888 (Sloan, 2005). The LCF is the main commercial fishery for Mulloway in South Australia and takes over 85 per cent of the total commercial catch. The Marine Scalefish Fishery takes the remainder (an average of 3.8 t per year since 2007/08, Fowler et al. 2012). The catch by the recreational sector was found to be slightly smaller than the catch by the commercial sector in 2000/01 (92 t or 38 percent of the total catch) and larger than the much diminished commercial catch in 2008/09 (38 t or 68 percent of the total catch) (Figure 9). These are the only two years for which data on the catch by the recreational sector have been estimated.

For the LCF, gill nets (mesh size at least 115 mm) are the dominant gear and are used to target Mulloway in the Murray River estuary. Catches from these nets account for over 80 percent of the total commercial catch and comprise exclusively juveniles (modal age 3 years, modal size 550 mm TL) (Figure 10). The legal minimum length for Mulloway taken in this area is 46 cm TL. Swinger nets are the secondary gear used to target Mulloway in the LCF. These are used to target feeding and

spawning aggregations of mature fish (Figure 10) in nearshore waters near the mouth of the Murray River during spring and summer. These nets are also gill nets but are required to have a larger mesh size (at least 150 mm). They are attached to several hundred metres of rope, allowed to drift out through the surf and are then carried ashore by longshore drift and manual hauling. The legal minimum length for Mulloway taken from these waters is 75 cm TL. The legal minimum lengths equate to 57 percent (Murray River estuary) and 92 percent (marine environment) of the size at 50 percent maturity and are considered unlikely to protect against recruitment overfishing (Ferguson and Ward, 2011).

Much of the catch of Mulloway is not retained. For the commercial catch a study of the commercial net fishery within the Murray River estuary and Coorong lagoons found that 64 percent of the catch was discarded, that these were sub-legal sized fish, and that the majority of the catch (over 70 percent) was dead at the time of net retrieval (Ferguson, 2010a). The post release survival of the remainder is not known.

For the recreational sector, 83 percent of the catch within the Coorong Lagoon (and 85 percent of the Statewide catch) was released (Jones, 2009). The post release survival of these is unknown but the vast majority were line caught.

The status of the Mulloway population in south eastern South Australia is strongly influenced by flows through the Murray River estuary. Periods of low flow reduce the amount of protected estuarine habitat available for juvenile Mulloway.

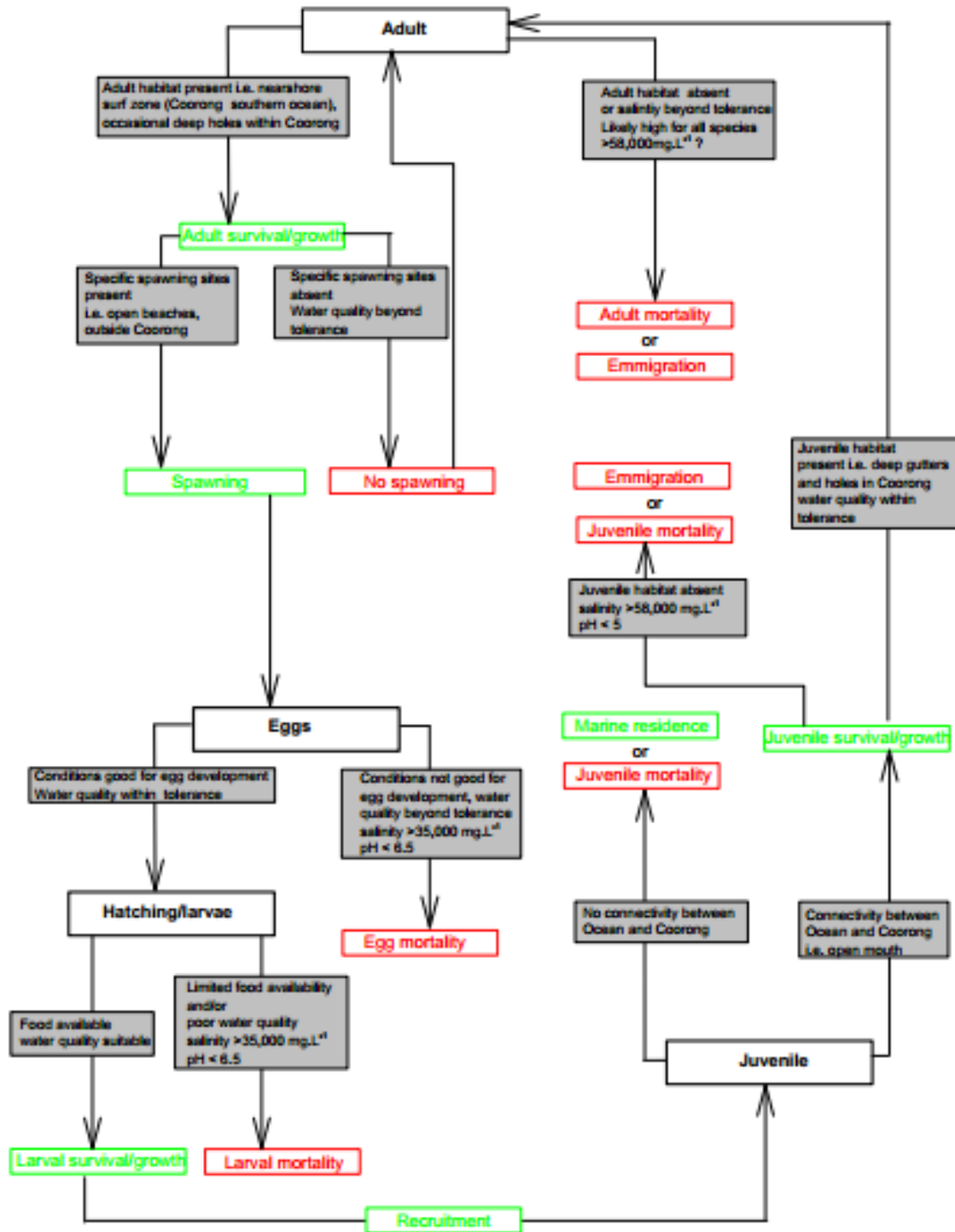


Figure 8. Life cycle of Mulloway. Different life history stages indicated by bold text. Positive events are shown in green and negative events in red. Habitat requirements and salinity tolerances are shown where known (Bice, 2010b).

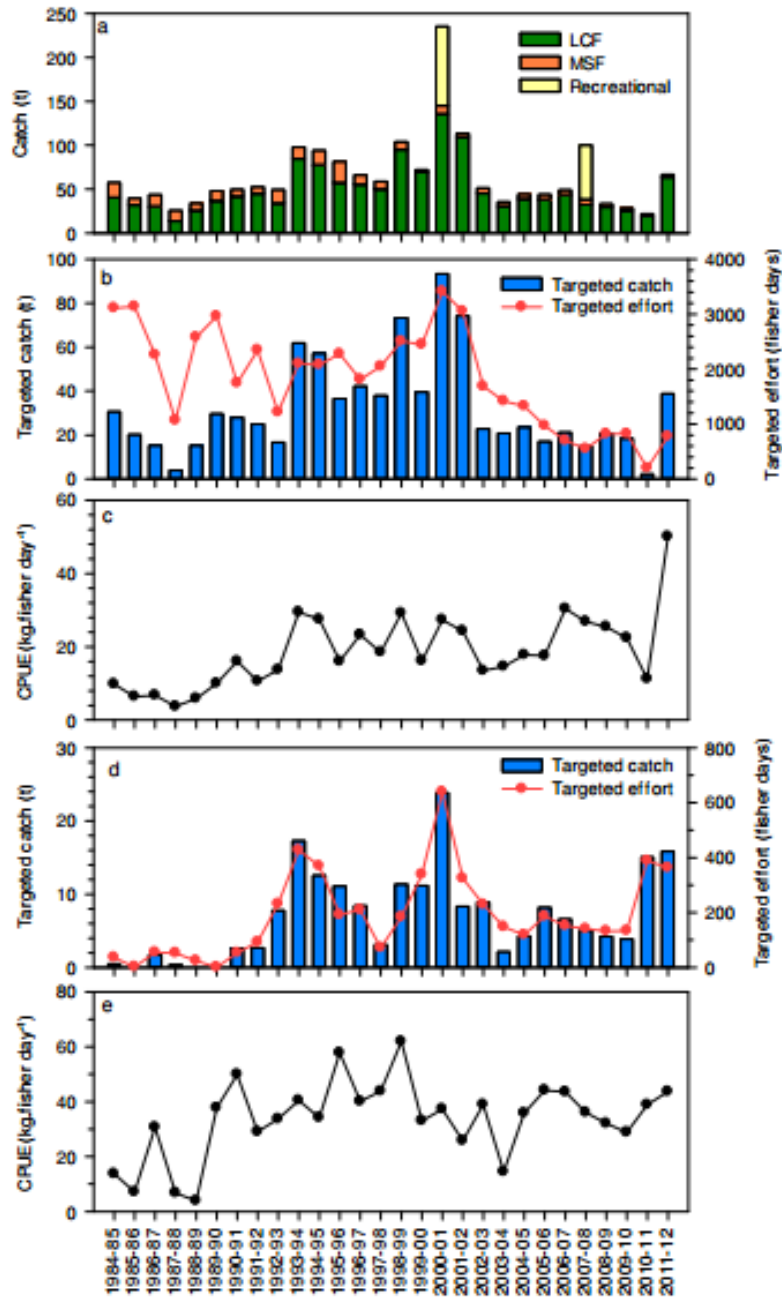


Figure 9. Annual levels of catch, effort and CPUE for Mulloway from 1985/85 to 2011/12 showing (a) total catch (MSF, LCF, recreational); including for large mesh gill nets, (b) targeted catch, targeted effort, (c) targeted CPUE. For swinger nets (d) targeted catch, targeted effort, and (e) targeted CUE. (Ferguson, 2012b). Note, estimates of the recreational catch are unavailable (not zero) for all years except the two shown,

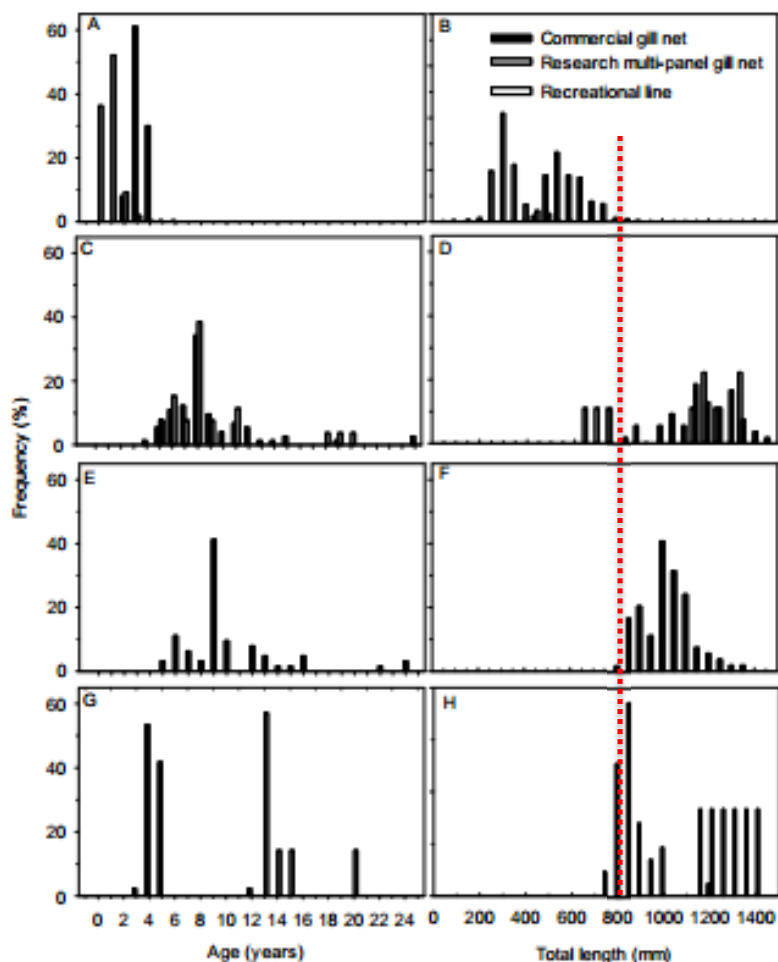


Figure 10. Age (left) and length (right) distributions of Mulloway from eastern South Australia. (A, B) the Murray River estuary in 2001; (C, D) the nearshore marine environment in 2001; (E, F) the nearshore marine environment in 2002. Also shown are age and length distributions for Mulloway from western South Australia from the nearshore marine environment (G,H) combining samples from the commercial (2002) and recreational (2003) sectors (*Ferguson and Ward, 2011*). (Red dotted line is approximate size at 50% maturity)

Harvest Strategy

Commercial catch limit reference points for Mulloway have been determined using the total commercial catch from all sectors (e.g. the Lakes and Coorong, marine scalefish and Rock Lobster fisheries) but CPUE reference points have been determined using targeted catch and effort data from the Lakes and Coorong Fishery only. Separate upper and lower CPUE reference points have also been determined for commercial mesh nets and swinger nets. The most recent stock assessment for Mulloway, however, noted that the upper and lower catch trend and CPUE trend reference points are widely separated and therefore do not provide informative criteria for the accurate assessment of the species (*Ferguson and Ward, 2011*).

Assessment

Results for Mulloway from the most recent annual LCF stock status report (*Ferguson, 2012b*) and from earlier stock status reports (*Ferguson, 2011, Ferguson, 2012a, Ferguson, 2010b*) indicated that both sectors of the fishery for Mulloway have been within the target ranges for all indicators except that total catch levels were below the lower reference point levels in 2009/10 and 2010/11 (Table 4).

There was no direct management action for Mulloway as a result of the reference point being breached. The reasons for this were that

- i. a stock assessment for Mulloway was to be produced (and was completed in 2011),
- ii. a review of the boat, bag and size limits was to commence soon, and
- iii. the development of a new management plan for the LCF was planned that would include development of a new harvest strategy for the net sector.

The most recent more detailed stock assessment report for Mulloway (Ferguson and Ward, 2011) noted this period of lower catch and, although drawing no specific conclusions about the current status of Mulloway, concluded that Mulloway in South Australia were vulnerable to over-exploitation because of the combination of critical juvenile habitat has been degraded by flow regulation and drought, establishment of a strong year class is dependent on strong freshwater inflows to the Murray River estuary and growth rates are low. This assessment also concluded that egg production may be compromised by the truncation of the age composition of the population that is likely the result of concurrent harvesting of juveniles in the estuary and adults in the nearshore marine environment, and of the high discard rates (with low post-release survival) of sub-legal sized juveniles.

The concerns expressed by this recent assessment are not unfounded. Nevertheless, if the level of recruitment to the fishery had been substantially reduced it would be likely that there would have been a substantial decline observed in the catch of the fishery, particularly as the majority of this catch is comprised of juveniles. The time series of catches (and the CPUE) is variable but essentially trendless suggesting that there has been a level of recruitment that has not been greatly diminished over the monitored period. More detailed analysis of this time series (Ferguson and Ward, 2011) has indicated that the spatial extent of the fishery had contracted over the recent extended period of low flow and proposed that a concentration of the remaining stocks of Mulloway may have allowed catches and CPUE to have been maintained. A direct measure of the levels of recruitment would give greater confidence that current management arrangements and recent harvest levels have maintained sufficient levels of recruitment.

This assessment has also been independently reviewed (Smith, 2013) and some of the chapters have also been published in scientific journals, adding another level of review. The review of the assessment noted that the ranges used for the indicators are quite broad and may not represent the best way to determine stock health. The review also notes that the relationship between recruitment and river flow is not strong (but that further analysis may expose a stronger one), that inferring exploitation rates from age structure requires careful analysis when there is variable recruitment, but that the persistence of strong year classes for at least 15 years suggests that exploitation levels cannot be unreasonably high. The review also suggested that a population model, fitted to time series data, would be the best way to undertake a combined and rigorous analysis of trends in catch, effort, CPUE, age structure and river flows. It supported improved monitoring of age structure and discarding.

Table 4. Performance indicators for Mulloway and reported levels for recent years. The highlighted values are either above (green) or below (yellow) the lower reference point.

Performance indicator	Upper reference point	Lower reference point	Year				
			2007-08	2008-09	2009-10	2010-11	2011-12
Total catch (t)	118	31		33.4	28.6	22.0	66.8
Total catch – 4 year trend	27	-27		-4.2	-6.7	-5.4	9.4
Mesh net CPUE (kg. fisher day)	28	5		25.4	22.3	11.2	50.1
Mesh net 4 year CPUE trend	7	-7		2	-2.6	-5.0	6.3
Swinger net CPUE (kg. fisher day)	57	6		32.1	29.3	38.8	43.6
Swinger net 4 year CPUE trend	16	-16		-4.2	-4.0	0.6	4.5

3.2.4 Golden Perch (*Macquaria ambigua*)

The most recent stock assessment report for Golden Perch (Ferguson and Ye, 2012) provides an overview of the species' biology, a description of the fishery and the latest information on stock status. Unless otherwise referenced, the following information on Golden Perch is drawn from that source.

Distribution and Stock Structure

Golden Perch (or callop as they are more commonly known in South Australia) are endemic to Australia and distributed throughout the Murray-Darling Rivers systems at altitudes less than about 600 m (Kailola et al., 1993). They are also widespread through the lower Murray River and Lakes Alexandrina and Albert (Bice, 2010b).

Significant bio-geographic structure associated with drainage basins has recently been identified among populations of Golden Perch in eastern Australia using mitochondrial DNA methods (Faulks et al., 2010). The central stock is the dominant stock and this genotype reaches down to the lower Murray lakes. The population abundance of this stock is distinctly flood-linked, with massive upstream migration producing pelagic eggs and larvae, which then reseed lower river reaches. In addition, an earlier study (Keenan et al., 1995) identified a genetically distinct stock in Lakes Alexandrina and Albert, a finding that is supported by differences in the age structure of populations of Golden Perch found in the lower Murray River and the lower lakes.

Biology

Golden Perch spawn during the austral spring and summer with extended spawning periods possible. Spawning occurs in response to flooding or a rise in water level at temperatures ranging from 18 to 25 °C. Fecundity is high and a single female may shed 500,000 eggs. Considerable speculation exists around the importance and role of flooding in the spawning and recruitment success for Golden Perch, particularly for the population in the lower lakes. Sampling there has indicated the presence of a range of age classes from years when there had been no flooding (Bice, 2010a) suggesting that although the population in the lower lakes may benefit from flood related strong recruitment, it is not dependent on such events.

For populations in the River Murray maturity is attained at 2 years for males and 4 years for females, but there is no estimate of size at maturity for the lower lakes. Golden Perch live to 26 years of age

and reach a maximum size of 760 mm TL. Growth is highly variable among sites and years. Golden Perch are opportunistic carnivores and larvae and juveniles benefit from food resources that become available following floods. Their diet in the lower Murray River and lower lakes has not been studied.

A schematic representation of the life history of Golden Perch is shown in Figure 11. Golden Perch is considered to be well adapted to the naturally dynamic stream flow conditions of the Murray-Darling system and, although their natural range and abundance in the tributaries declined after European settlement, the species remains abundant in the lower Murray-Darling rivers.

Fishery

The LCF is the main commercial fishery permitted to take Golden Perch in South Australia. It is an important target species and in 2010/11 comprised 4 percent of the total catch and 19 percent of the total value (Knight and Tsolos, 2012). Golden Perch are taken from the lower lakes by gill nets. The commercial fishery also used to operate in the lower River Murray but the river fishery was closed in 2003.

Management arrangements for the commercial fishery for Golden Perch comprise general gear restrictions, spatial and temporal closures and a legal minimum size of 330 mm TL.

The commercial catch of Golden Perch has fluctuated substantially from year to year as have fishing effort and CPUE (Figure 12). Periods of higher catches and catch rates were likely to be due to the recruitment of several strong year classes which have been related to flooding in 1989 and the early 1990s. Recent work has also indicated that successful spawning may also occur in non-flood years.

Recreational fishers may take Golden Perch with hooks (a rod and line or hand lines) or a gill net. The hook fishery is open access but the previously open access recreational gill net fishery is being phased out. There is now only a limited number (770 in 2012) of registered gill nets. A bag limit of 5 fish per fisher per day and a boat limit of 15 fish per day apply as does a legal minimum size of 300 mm TL. Registered gill nets must be 110-150 mm mesh size, less than 75 m long and the registered net owner must be within 50 m of the net at all times when fishing.

In 2000/01 the estimated recreational catch of Golden Perch in South Australia (\pm 95% confidence interval) was 86,732 (\pm 12,086) fish or 91 t and the overall release rate was 69 percent. The vast majority of this catch (95 percent) came from River Murray and none was reported from the Lakes and Coorong (Ye, 2005). In 2007/08 (the only other year for which an estimate is available) 39,861 (\pm 16,027) Golden Perch were harvested with a release rate of 24 percent (Jones, 2009). Again, most were caught in the Murray but small numbers were reported to have been taken from the lower lakes. The harvested catch was an estimated 46.5 t which represented 28.4 percent of the combined commercial and recreational catch in that year (Jones, 2009)

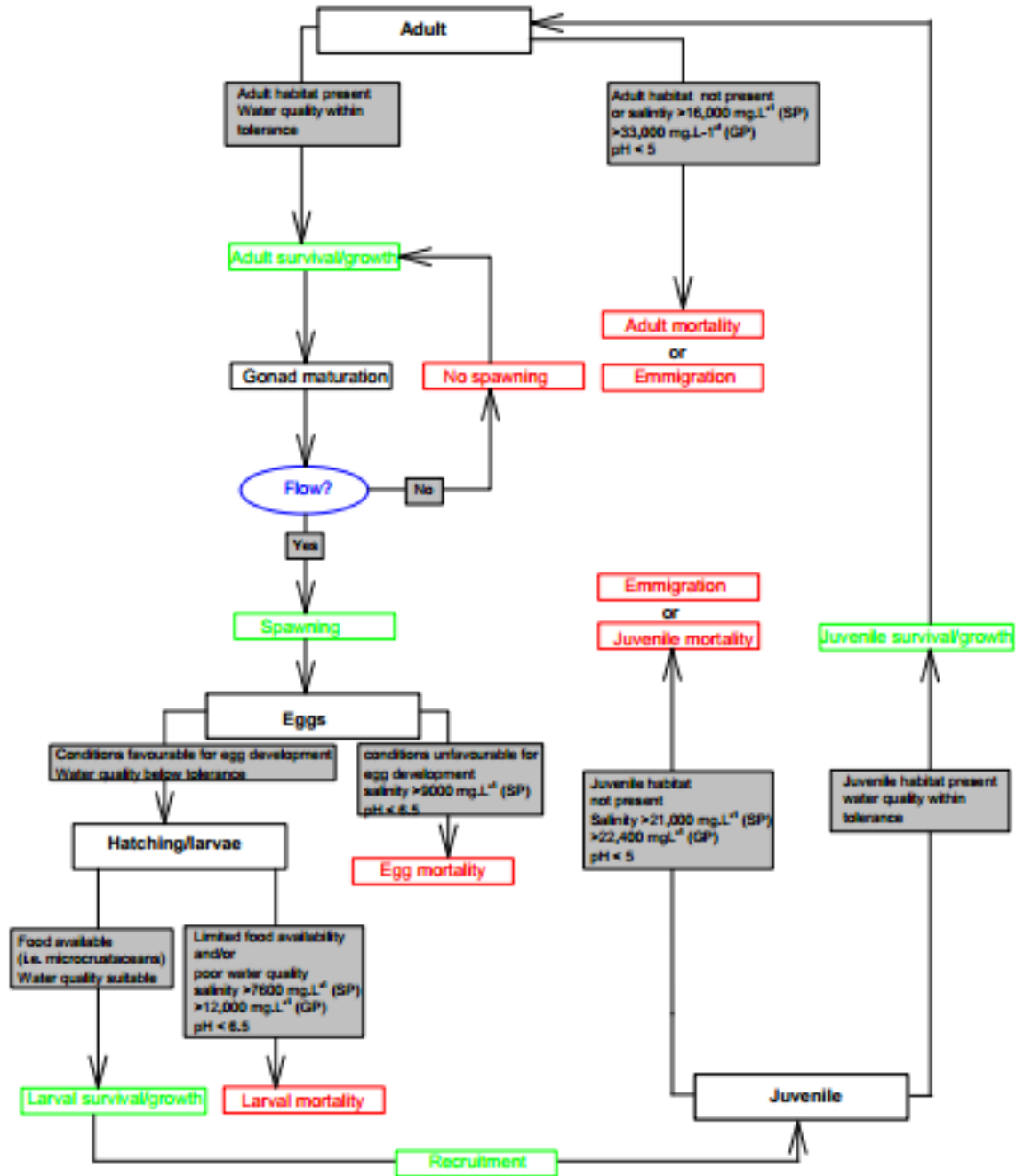


Figure 11. Life cycle of Golden Perch (GP). Different life history stages indicated by bold text. Positive events are shown in green and negative events in red. Habitat requirements and salinity tolerances are shown where known (Bice, 2010b). SP, attributes for Silver perch (*Bidyanus bidyanus*).

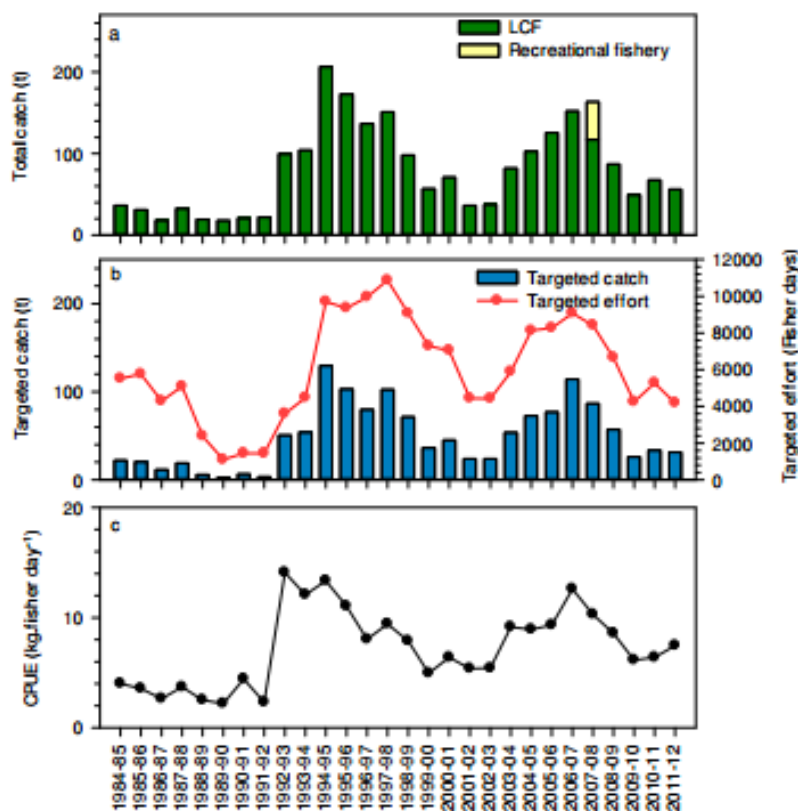


Figure 12. Annual levels of catch, effort and CPUE for Golden Perch from 1984/85 to 2011/12 showing: (a) total catch, including for large mesh gill nets (b) targeted catch, targeted effort and (c) targeted CPUE. Note an estimate of the recreational catch is available for 2007/08 only (Ferguson and Ye, 2012).

Harvest Strategy

The harvest strategy uses the performance indicators and reference points outlined in the Management Plan (Sloan 2005). The most recent stock assessment for Golden Perch, however, noted that the upper and lower catch trend and CPUE trend reference points are widely separated and therefore do not provide informative criteria for the accurate assessment of the species (Ferguson and Ye, 2012).

The usefulness of CPUE as an indicator of stock status for Golden Perch can also be compromised by episodes of gear saturation. Fishers report that large catches of carp and Bony Bream reduce the ability of their mesh nets to capture Golden Perch. The frequency and significance of this effect has not been assessed in terms of relationship to effort related indicators (such as CPUE).

Assessment

Results for Golden Perch from the most recent annual LCF stock status report (Ferguson, 2012b) and from earlier stock status reports (Ferguson, 2011, Ferguson, 2012a, Ferguson, 2010b) indicated that all performance indicators have been within the target ranges since 2008/09 (Table 5). The recent more detailed stock assessment report (Ferguson and Ye, 2012) notes that Golden Perch may be vulnerable to overexploitation because of its longevity (26 years) and age at maturity (4 years for females). It also notes that there may be a dependence on years of high flow for establishment of strong year classes and that the lower Murray River experienced the worst drought in recorded history from 2002 to 2009. Nevertheless, recent sampling of Golden Perch in the lower lakes has indicated a wide range of age classes including fish close to the maximum recorded age, as well as

large numbers of juveniles (Figure 13). It concludes that the Golden Perch population in Lake Alexandrina is sustainably exploited. This assessment report also notes that a number of uncertainties remain of which the most significant is the continued reliance on fishery-dependent catch and effort data for the index of abundance.

Table 5. Performance indicators for Golden Perch and reported levels for recent years. No values have been below the lower reference point.

Performance indicator	Upper reference point	Lower reference point	Year				
			2007-08	2008-09	2009-10	2010-11	2011-12
Total catch (t)	117	20		87.0	49.2	67.4	56.2
CPUE (kg. fisher day)	13	2		8.6	6.1	6.4	7.5
Total catch – 4 year trend	56	-56		-15.0	-33.8	-18.7	-7.4
CPUE - 4 year trend	4	-4		-0.5	-2.1	6.4	-0.3

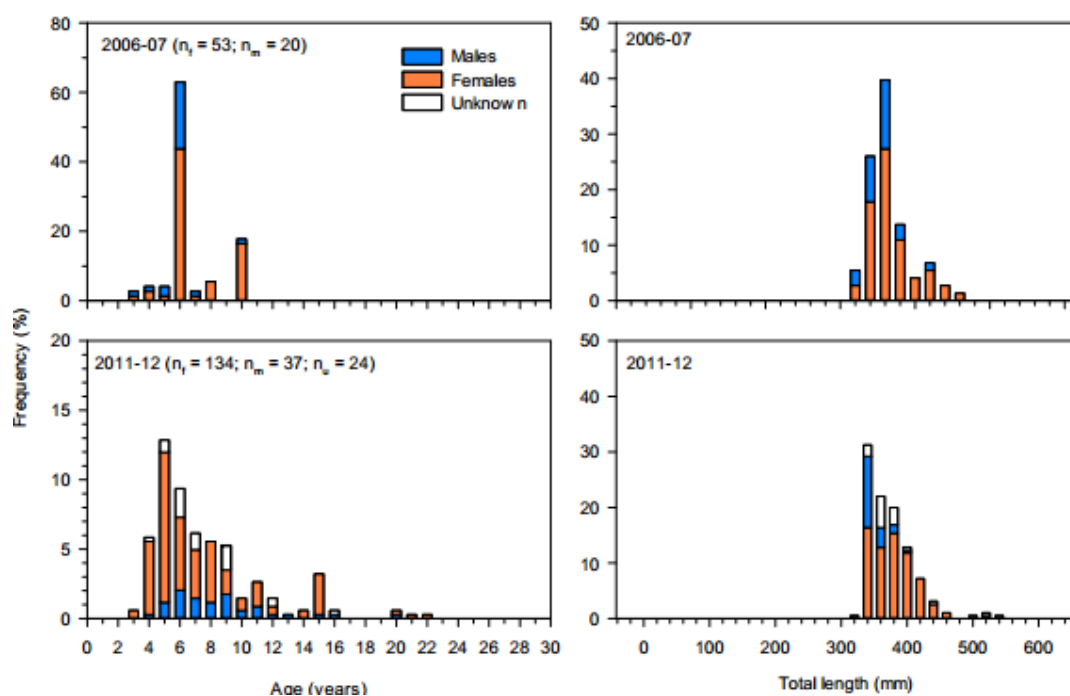


Figure 13. Golden Perch age (left) and size (right) composition from the lower lakes in 2006/07 and 2011/12.

3.2.5 Yellow-eye Mullet (*Aldrichetta forsteri*)

The stock assessment report for Yellow-eye Mullet (Higham et al., 2005) provides an overview of the species' biology, a description of the fishery. Unless otherwise referenced, the following information is drawn from that source.

Stock Structure

There are thought to be separate eastern and western Australian stocks of Yellow-eye Mullet based on differences in the counts of lateral line scales and gill rakers and differences in spawning season. Yellow-eye Mullet in South Australia are morphologically similar to the western stock but their

spawning season is similar to the eastern stock. They are managed as a separate South Australian stock but some structuring with South Australian waters is also possible.

Biology

Yellow-eye Mullet are found in brackish and inshore coastal waters and estuaries with a preference for shallow estuaries (Kailola et al., 1993). Their association with estuaries has been described as an “estuary opportunist” in that they regularly use estuaries as part of their life cycle but do not need access to low salinity waters to complete their life cycle. A schematic representation of their life cycle (as one of a number of large-bodied estuarine species) is given in Figure 14.

In the Coorong, Yellow-eye Mullet spawn in summer and early autumn and fish may spawn more than once during the year. Spawning may occur within estuaries but may also occur in nearshore marine environments.

Yellow-eye Mullet in the Coorong reach a maximum size of 40 cm TL. Size at maturity is 23 cm FL for females and 22 cm FL for males but there is some uncertainty about these estimates for the Coorong population. Fish of these sizes are 2 years old.

Yellow-eye Mullet are considered to be omnivorous and eat detritus, seagrass, micro and macro algae as well as small molluscs, crustacea, insect larvae, other invertebrates, fish and epiphytes. Food items have been found to be in direct proportion to their abundance in the estuary. Diets also vary seasonally and with fish size.

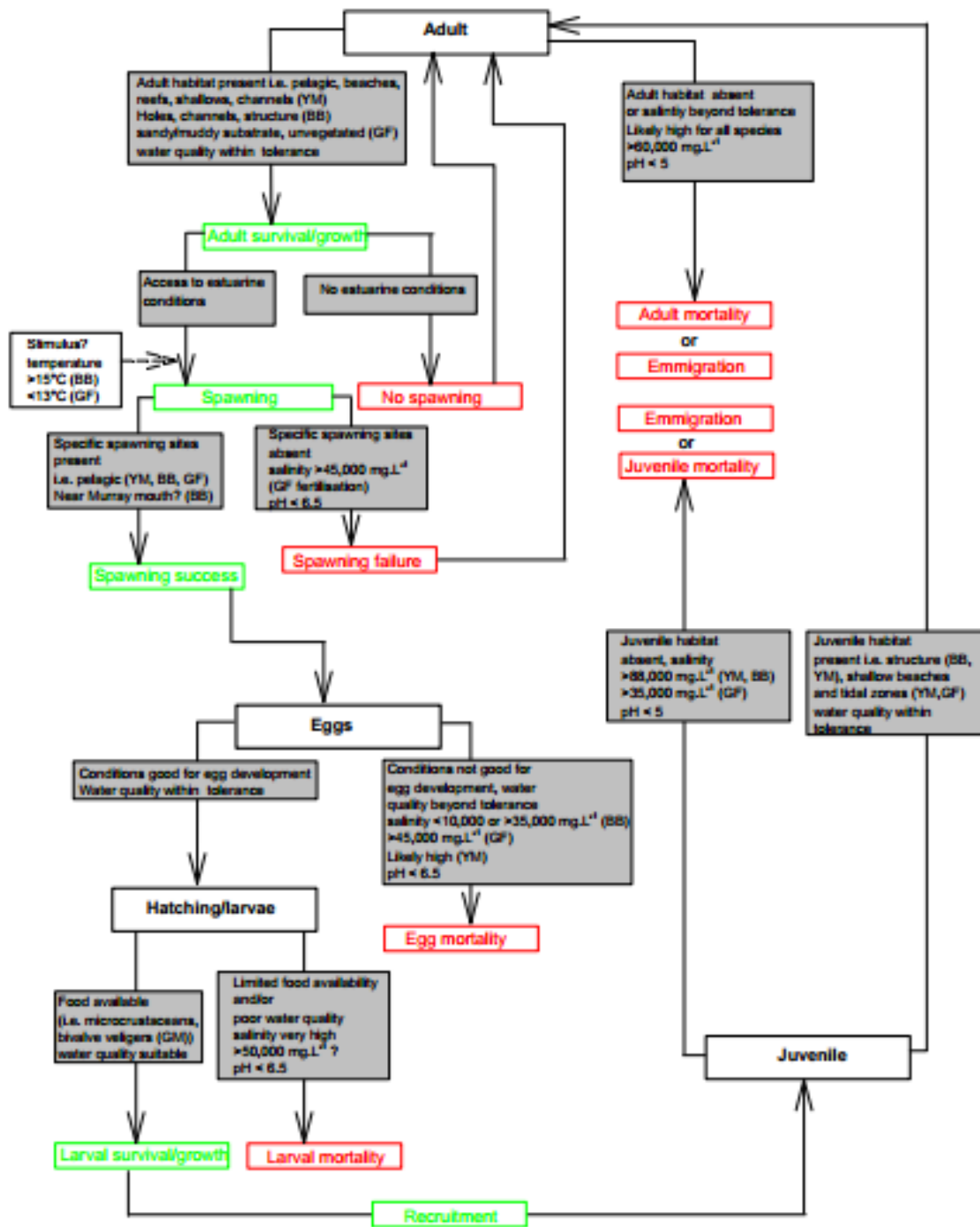


Figure 14. Life cycle of large-bodied estuarine species including Yellow-eye Mullet (YM). Positive events are shown in green and negative events in red. Habitat requirements and salinity tolerances are shown where known (Bice, 2010b).

Fishery

Yellow-eye Mullet are caught throughout South Australia but the main commercial catch is taken from the Coorong lagoons by fishers in the LCF. Catches in the LCF have represented about 90 percent of the statewide catch over the last 4 years. Trends in catch, effort and CPUE for the LCF are

shown in Figure 16 (from Ferguson, 2012b). Small mesh gill nets (>50 mm and ≤64 mm mesh size) account for about 90 percent of the LCF catch of Yellow-eye Mullet. CPUE has been variable but generally increasing over a long period.

The Marine Scalefish fishery takes the remainder of the South Australian commercial catch (an average of 28.6 t per year since 2007/08, Fowler et al., 2012) using haul nets with most of the catch coming from the Spencer Gulf and Gulf St Vincent. Trends in the targeted catch, effort and CPUE from this sector are shown in Figure 17. CPUE in this sector has also increased in recent years.

Recreational fishers also catch Yellow-eye Mullet using both hook and line and gill nets. In 1985, gill nets were believed to be the dominant gear. The 2000/01 National Recreational and Indigenous Fishing Survey indicated that hook and line was the main capture method across all species but net fishers may have been underrepresented in this survey. In this survey and in the 2007/08 recreational fishing survey in South Australia Yellow-eye Mullet were not separately identified but included as part of a mullet species group. The total catch of all mullet species reported in the 2000/01 survey was 573,381 of which 84 percent were retained; in the 2007/08 survey the total mullet catch was 151,654 fish or 28 t which represented 10 percent of the total recreational and commercial harvest.

Annual commercial catches of Yellow-eye Mullet in Western Australia (which may form part of the same stock) were between 22 t and 37 t from the West Coast Bioregion and less than 5 t between 2006 and 2010 (Fletcher and Santoro, 2012).

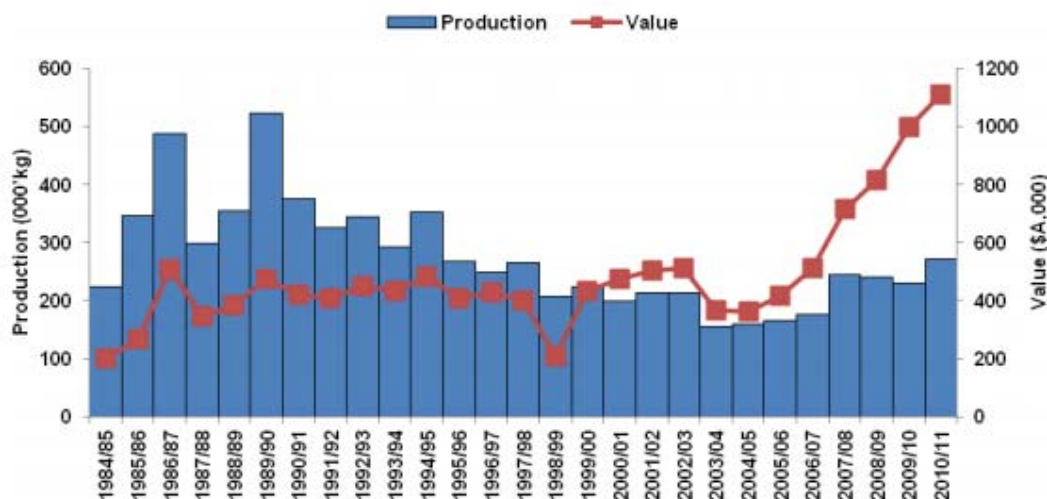


Figure 15. Total production and value of Yellow-eye Mullet from South Australian fisheries 1984/85 to 2010/11 (Knight and Tsolos, 2012).

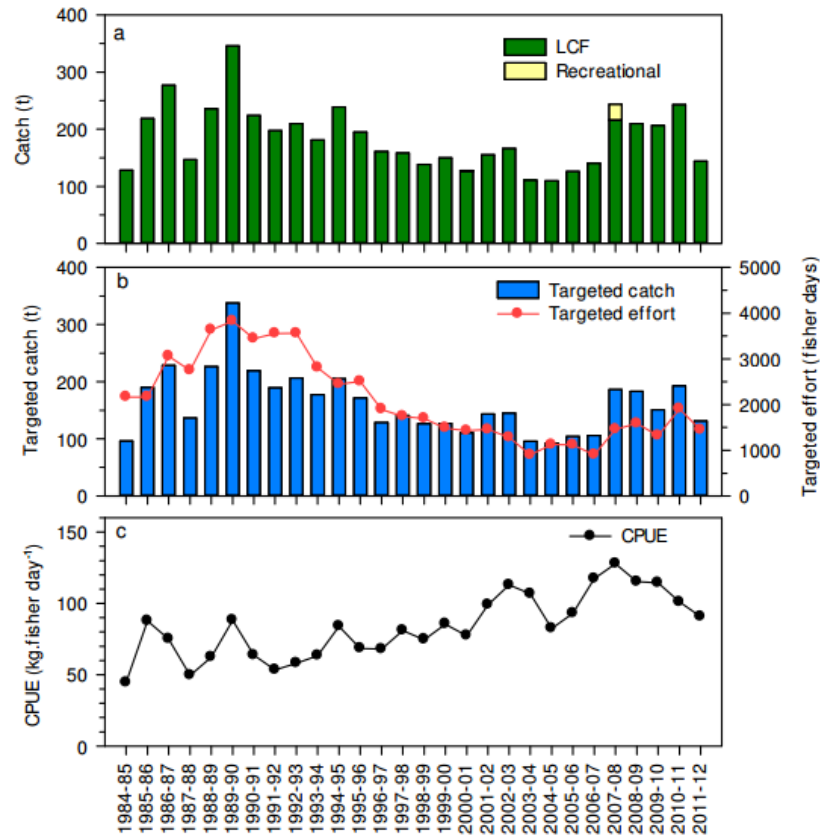


Figure 16. Annual levels of catch, effort and CPUE for Yellow-eye Mullet from 1984/85 to 2011/12, showing (a) total catch (LCF, recreational); including for small mesh gill nets (b) targeted catch, targeted effort, and (c) targeted CPUE. Note that an estimate of the recreational catch is available for 2007/08 only.

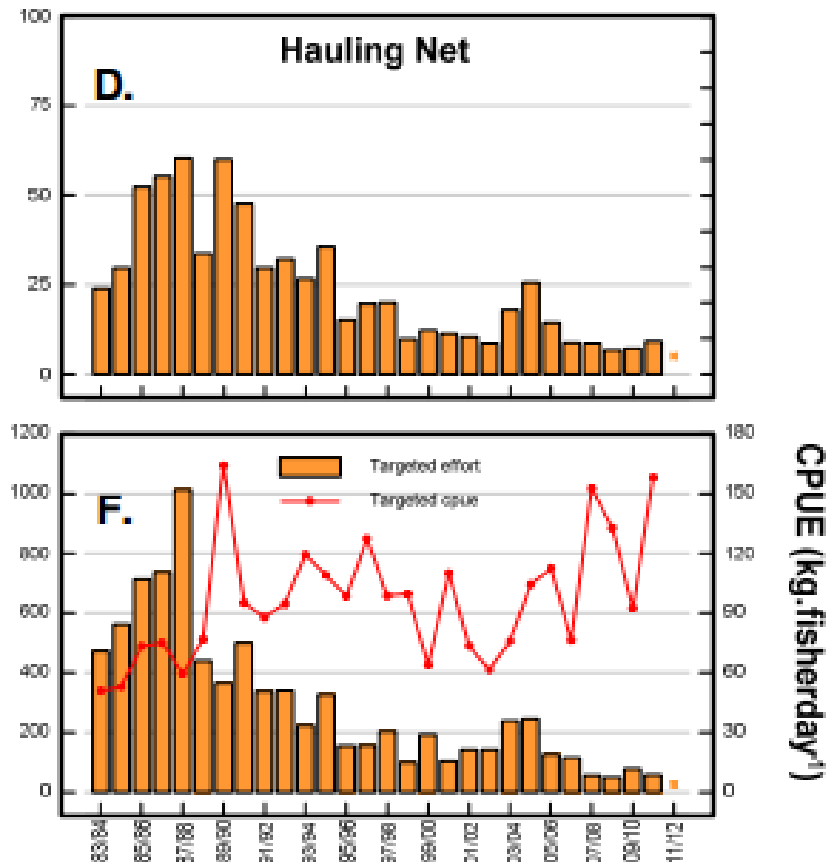


Figure 17. Yellow-eye Mullet catches in the Marine Scalefish Fishery showing (D) targeted annual State-wide catches using hauling nets, and (F) targeted annual State-wide hauling net effort and CPUE (Fowler *et al.* 2012).

Harvest Strategy

The harvest strategy for Yellow-eye Mullet in the LCF uses the performance indicators and reference points outlined in the Management Plan (Sloan, 2005). The targeted catch and CPUE indicators for Yellow-eye Mullet are based on the catch by small mesh gill nets.

In the Marine Scalefish Fishery similar performance measures are used but are based on hauling nets rather than mesh nets.

As noted for Golden Perch, the usefulness of CPUE as an indicator of stock status for Yellow-eye Mullet can also be compromised by episodes of gear saturation. Fishers report that large catches of Carp and Bony Bream reduce the ability of their mesh nets to capture Yellow-eye Mullet. The frequency and significance of this effect has not been assessed.

As noted for Golden Perch, the usefulness of CPUE as an indicator of stock status for Yellow-eye Mullet can also be compromised by episodes of gear saturation. Fishers report that large catches of Carp and Bony Bream reduce the ability of their mesh nets to capture Yellow-eye Mullet. The frequency and significance of this effect has not been assessed.

Assessment

The 2005 assessment noted the limitations of an assessment based on commercial catch and effort data but considered that they do provide a useful indicator of the abundance of Yellow-eye Mullet.

Catches and CPUE were noted as having been stable over recent years and the assessment concluded that there were no data to suggest that the levels of fishing effort for Yellow-eye Mullet were unsustainable. It noted, however, that the performance indicators for the fishery (particularly CPUE) need refinement and that basic biological information on patterns of age, growth and reproduction are needed to assess current management arrangements (e.g. minimum legal size) and to formally assess the sustainability of current exploitation levels. Performance indicators for the fishery have generally remained within the target ranges but exceeded the upper CPUE reference points in two recent years (Table 6).

No performance indicators for Yellow-eye Mullet in the Marine Scalefish Fishery have been breached.

In Western Australia Yellow-eye Mullet is considered to be one of a suite of species for which the impacts of environmental factors on stock abundances are likely to be at least as important as fishing pressure and whose status may also be affected by the availability and quality of estuarine habitats (Fletcher and Santoro, 2012).

Table 6. Performance indicators for Yellow-eye Mullet in the LCF and reported levels for recent years. Values shaded green were above the upper reference point.

Performance indicator	Upper reference point	Lower reference point	Year				
			2007-08	2008-09	2009-10	2010-11 ¹	2011-12
Total catch (t) (LCF)	312	124		209.8	206.8	N/A	144.4
CPUE (kg. fisher day)	93	47		115.2	114.5	N/A	90.8
Total catch – 4 year trend	45	-45		32.6	19.2	N/A	-16.0
CPUE - 4 year trend	13	-13		7.7	-2.1	N/A	-8.7

¹ Values for 2010-11 are not available.

3.3 Principle Two: Ecosystem Background

3.3.1 The Ecosystems

Physical Setting

The Lakes and Coorong Fishery (LCF) operates in the waters of three separate, but closely linked, ecosystem components at the entrance of the Murray River to the Southern Ocean, on the south coast of South Australia (Figure 1):

1. The lower River Murray lakes;
2. The Coorong lagoons; and
3. The coastal marine waters adjacent to the Sir Richard and Youngusband Peninsulas, out to three nautical miles from the low water mark, including near the ocean entrance of the Murray River.

These individual ecosystem components are collectively known as the Coorong, Lower Lakes and Murray Mouth (CLLMM).

The Murray River is Australia's largest river, discharging into Lake Alexandrina, before entering the Coorong, and finally discharging to the Southern Ocean via the Murray Mouth.

The Lower Lakes comprise Lakes Alexandrina and Albert, and are the largest permanent lakes in South Australia, with an average depth of about 2.9 m covering an area of approximately 400 km². Lake Alexandrina is the larger of the two lakes and is connected to the adjacent Lake Albert via a narrow entrance. Lake Albert is a closed lake, with only the single entrance for entry and exit for surface water. The vast majority of freshwater inflows into Lake Alexandrina originate from the River Murray although additional smaller freshwater inputs arise from other local tributaries, from groundwater, and from local rainfall. The two lakes are normally connected, but recently they were temporarily separated by an embankment installed as an emergency drought mitigation measure. Inputs of freshwater to the Coorong are primarily from Lake Alexandrina, via an extensive set of barrages. Ocean water substantially enters the Coorong via the Murray Mouth, but there is also input of ocean-water through the seaward dunes, and freshwater via the local catchment runoff and groundwater. Each of these inputs can be substantial, depending on climatic and local conditions.

Historically, the Lower Lakes formed part of a major complex of river-end estuarine and freshwater wetlands that were fed by the Murray River and local sources. After water had passed through this wetland system, it exited to the Southern Ocean through a set of barrier dunes at locations (now known as the Murray Mouth) that varied both in volume and location depending on freshwater input and interaction with ocean waters. In the 1930's and 40's, five tidal barrages with a total length of ~7.6 km were constructed to prevent saltwater from intruding upstream into the Lower Lakes, and to maintain a stable freshwater storage above the barrages for water extraction purposes. The construction of these barrages dramatically reduced the extent of the former Murray Estuary, creating an impounded freshwater environment upstream (the Lower Lakes) and forming an abrupt ecological division between the Lakes and the downstream estuarine/marine (the Coorong).

The barrages now isolate the Lower Lakes from ocean water influence, and the lakes are only fed by water from the Murray River and local sources, which varies from fresh to brackish, depending on location and climatic factors. The Coorong is now the estuary for the Murray River, where water discharged from Lake Alexandrina across the barrages can mix with ocean water, depending on inflows from the ocean of marine water driven by wind, wave and tidal forces.

The Coorong is a long, shallow, lagoonal system that stretches approximately 110 kilometres in a south-easterly direction from the point of water delivery from Lake Alexandrina (via the Barrages). Two narrow sand dune peninsulas (Sir Richard and Younghusband Peninsulas) separate the Coorong from the ocean. The Coorong is connected to Encounter Bay in the Southern Ocean via the Murray Mouth, which is now the only connection to the sea, maintained as required by entrance dredging.

The Coorong is defined as an inverse estuary — low-salinity water enters the system from inputs nearest to the ocean, rather than the more-usual configuration of estuaries — having fresh inflows entering at the end distant from the connection to the sea. This creates a strong natural salinity gradient from usually-estuarine conditions around the Murray Mouth increasing in a south-east direction to hypersaline conditions in the South Lagoon prevailing in about the last 200 years (Lester et al., 2010).

While the Murray River is Australia's largest river, and the Coorong is the largest temperate estuary (Ferguson et al., 2013), drought, and water regulation and abstraction in the upstream reaches and tributaries of the river have combined in recent times to drastically reduce flows of freshwater reaching the Lower Lakes, the Coorong below the barrages, and the Murray Mouth. Until 2011, drought conditions prevailed for the 8 previous years, and this period of very low or nil River Murray inflow to the Lower Lakes resulted in reduced water levels, and desiccation in Lake Albert, and the development of an extreme salinity gradient below the barrages along the length of the Coorong. During this recent drought period, South Lagoon of the Coorong (furthest from the barrages) desiccated across much of its area, and salinities in the area of South Lagoon that remained

submerged reached extreme levels (>200g/l; >5 times more salts than seawater), and in places, reached complete salt saturation. Now, water does not discharge from the mouth of the Coorong into ocean waters about 40% of time, compared to about 1% of time under its former unregulated condition (Kingsford et al., 2011).

The drought, exacerbated by the water abstraction and the effects of the barrages, has had a major impact on the ecology of the lakes and the Coorong throughout this period of drought, including on water and sediment quality, as well as species structure and function and ecosystem processes. The outcome of this in the lakes system has been reductions in vegetation, disconnection and drying of wetlands, reductions in abundance of threatened fish species, and significant decreases in shorebird numbers. In the last 2 years, with the breaking of the drought, water inputs have returned to the pre-drought levels of the 1990s, and the ecosystems have begun to respond.

Ecosystem Values

As the estuary wetland complex for Australia's largest river and associated river basin, and with a diversity and extent of habitats that is exceptional in Australia for a temperate wetland ecosystem, the CLLMM has an intrinsic set of national environmental values. These values cover a range of flora and fauna, including migratory birds identified in several bilateral international conservation agreements.

The Coorong and Lower Lakes were designated as a Wetland of International Importance under the Ramsar convention in 1985, based upon its unique ecological character and its importance to migratory wader birds. In addition, the Coorong, Lower Lakes and Murray Mouth have collectively been assigned as one of six 'icon sites' within in the Murray-Darling Basin, Australia's largest river catchment system.

The CLLMM Ramsar site is ranked as South Australia's most important wetland and Australia's fourth most important wetland in terms of the numbers of waterbirds that it supports (Kingsford et al., 2012). With its diversity of ecological features, the site provides a wide range of habitats — a unique mosaic of 23 wetland types that provides habitat for nationally threatened species such as the Fairy Tern, Orange Bellied Parrot, Southern Mount Lofty Ranges Emu Wren and the Murray Cod. Waders and waterfowl are the predominant bird species, including the Curlew Sandpiper, Banded Stilt, Red-capped Plover, Masked Lapwing, Red-kneed Dotterel, Black Swan, Cape Barren Goose, Musk Duck, Straw-necked Ibis, Royal Spoonbill, Rufus Night Heron and Australian Pelican. The Ngarrindjeri people continue to have a close association with the area and some of the northern islands within the Coorong lagoon are reserved for their use. Most of the edge of Lakes Alexandrina and Albert is used for farming.

While about 80 species of fish have been recorded from the CLLMM region, many of these have not been found in recent surveys. The fish consist of species that are obligate freshwater, diadromous (must move between fresh and estuarine water to complete life cycle), estuarine, and marine. The fish fauna of the present day is dominated by about 25 species, including the 7 species mainly caught in the LCF and a recreational fishery across the area.

The Coorong is divided into the North and South lagoons by a constricted area which limits water exchange (Parnka Point). The North Lagoon has an area of approximately 73 km², while the South Lagoon has an area of approximately 80 km². Overall, the Coorong is shallow (average depth about 1.1 m) and is characterised by significant water level variations on seasonal and shorter time scales. The substantial salinity gradient that mostly prevails along the length of the Coorong provides a range of aquatic habitats that support different communities. Generally, the Coorong estuary can be broadly divided into an estuarine/marine, slightly hypersaline (1-2x seawater), moderately hypersaline (2-4x seawater) and highly hypersaline (>4x seawater) regions.

The estuarine/marine system, near the Murray Mouth, is typically characterised by the presence of the commercial fish species Yellow-eye Mullet [*Aldrichetta forsteri*], Black Bream [*Acanthopagrus butcheri*], Greenback Flounder [*Rhombosolea tapirina*] and Mulloway [*Argyrosomus hololepidotus*]; as well as abundant populations of polychaetes (marine worms) and other benthic invertebrates (molluscs, crabs, etc.) on the tidal mudflats.

The slightly hypersaline condition in part of the North Lagoon supports a subset of this estuarine fauna that is ecologically simpler and less diverse. This system grades into moderately hypersaline which, until recently, also dominated the South Lagoon. This moderately hypersaline system is dominated by the highly productive aquatic angiosperm *Ruppia tuberosa*, the chironomid *Tanytarsus barbitarsus* and a single fish species, the Small-mouth Hardyhead (*Atherinosoma microstoma*). These communities also support a large number of migratory waders, piscivorous birds (terns, pelicans) and waterfowl (ducks).

The drought years have resulted in the development of a new, previously unrecorded, highly hypersaline system in the South Lagoon. This highly hypersaline system has a much simplified macroinvertebrate community, mainly brine shrimp [*Parartemia zietziana*] and a few dipteran larvae, and no fish (with the occasional exception of a limited density of hardyhead in winter, when salinity is slightly lower). The reduction of diversity with increasing salinity along the Coorong is common across all taxonomic classes: birds, fish, plants and benthic fauna. While the ecologically simplified highly hypersaline South Lagoon system has relatively high primary production rates and can support large numbers of a few specialist bird species, such as Banded Stilts (*Cladorhynchus leucocephalus* - a species usually associated with inland salt lakes), it does not support any large or predatory fish.

Changes in the food web structure along the length of the Coorong salinity gradient are extensive. Four trophic guilds (groups of organisms performing a similar ecological function) can be identified. These include “herbivores” (various invertebrate taxa) “predatory invertebrates” (*Nephtys*, *Phyllodoce* and *Macrobrachium*), “benthic feeders” (smaller fish species or smaller size-classes of larger fish species feeding on invertebrates), and “piscivorous fish” (larger Black Bream and all size-classes of Mulloway that feed, in part, on other fish). The trophic guilds change over a relatively short distance along the length of the Coorong with increased distance from the river mouth and as salinity increases. As species and guild diversity decrease up the salinity gradient, food chains become shorter. In the vicinity of the Murray Mouth, the food chain length leading to the top predator has been estimated to be ~4.6 (with Level 1 – plants, Level 2 – herbivores, Level 3 – first order predators, etc.), whereas the food chain length was estimated to be only ~3.3 at moderately to highly hypersaline locations in the North and South lagoons, where piscivorous fish were absent. Black Bream, Mulloway and Greenback Flounder decreased in trophic position with increased salinity, possibly reflecting a decreased availability of larger prey or an increased reliance on omnivory (feeding across several trophic levels). These findings suggest that habitat quality for predatory fish decreases with increasing salinity in the Coorong because prey diversity decreases. The trophic guild analysis also demonstrates that polychaetes (such as *Phyllodoce* sp., *Nephtys* sp.) and crabs (such as *Paragrapsus* sp.) are key components of the Coorong food web leading to large fish (Deegan et al., 2010).

Breaking of the Drought

In the winter of 2010/11, increased flows in the River Murray led to significant barrage releases (~13,000 GL/yr.) into the Coorong. Broadly, salinities decreased in the Coorong, and coupled with other freshwater induced environment changes, this elicited significant ecological responses in fish assemblages in the region. These included an increase in the diversity and abundance of freshwater species; enhanced recruitment and subsequent abundances of small-bodied estuarine/opportunist

species (Small-mouth Hardyhead, Tamar Goby and Sandy Sprat) and catadromous species (Congolli); and a southward range expansion for several key species, such as Black Bream (Ye et al., 2011).

With ongoing high flow conditions and barrage releases in 2011/12 salinities in the Coorong have remained similar to those of 2010/11, with a similar salinity gradient between the Murray Estuary and the South Lagoon. During 2011/12 fish populations of most key species (including native freshwater species) in the Coorong maintained similar distributional ranges to those observed in 2010/11, while others extended their distribution further southward (Black Bream, Yellow-eye Mullet, Sandy Sprat and Tamar Goby). Diadromous and estuarine fish continued to recruit in 2011/12. The recruitment success of Congolli and Mulloway was confirmed by age structure data, showing strong year classes for 2010/11 and 2011/12. Estuarine conditions were maintained in the North Lagoon, which provides suitable nursery grounds for many fish species (catadromous, small-bodied and large-bodied estuarine resident and opportunistic species). In 2011/12, small-mouth hardyhead maintained their presence and further increased in abundance in the South Lagoon, spawning and recruiting successfully in this lagoon (Ye et al., 2012).

The positive responses in fish assemblages following the significant flows of 2010/11, and further flows in 2011/12 indicate some early signs of recovery in the Coorong ecosystem. However, it is of concern that Black Bream, an iconic estuarine resident species, showed no signs of population recovery in the Coorong, and the overall population trajectory was uncertain for other large-bodied species (i.e. Greenback Flounder and Mulloway). Population recovery for such relatively long-lived large-bodied species could take years (Ye et al., 2012).

3.3.2 The Species

Commercial fishers are permitted to use the fishing devices that are registered and endorsed on their licence, subject to various regulations, conditions and industry codes of practice (Sloan, 2005).

A variety of fishing methods are used in the LCF to catch the various species, reflecting the diversity of species and habitat types that are accessible to the fishery. The LCF fishery regulations permit licence holders in the LCF to take species from 11 invertebrate groups, 32 fish groups, and 3 groups of Elasmobranchs (skates, rays and sharks other than the Great White Shark). The main gear types used are nets (mesh, swinger, hauling, drum, and dab), and cockle rakes and nets.

The current LCF is based on the capture and retention of seven main target species of native fish: Mulloway, Black Bream, Yellow-eye Mullet, Greenback Flounder, Pipi (or Goolwa Cockle), Golden Perch (or Callop), Bony Bream; and one non-native species —European Carp. Of these species, only Bony Bream is currently considered to be a 'main retained' species (for Principle 2 assessment) as it currently meets the MSC 5% threshold for catch biomass. This excludes those species assessed as the unit of certification (Principle 1 assessment - Pipi, Mulloway, Golden Perch, and Yellow-eye Mullet) and the non-native European Carp. While Bony Bream is a large component of the current annual catch, it is not considered particularly vulnerable to fishing pressure, and it is a low value species, sold primarily for bait, and so is not a species that is likely to drive fishing patterns.

For the purposes of this assessment, Greenback Flounder and Black Bream are considered as 'retained' species. Greenback Flounder is currently a low volume species, but in recent years it has yielded up to 30 t, comprising about 10% of the fishery value in 2011-2012. Also, historically, Greenback Flounder comprised a much larger proportion of the total catch — in the mid-70s, annual catches of over 200 t were recorded (Ferguson, 2007). So, while it does not currently meet the MSC 5% specification for the 'main retained' category of catch, Greenback Flounder is considered as a potential 'main retained' species, in the event that post-drought ecosystem recovery leads to an increase in biomass, which if it occurs will be rapid (in the next few years).

Black Bream was also historically a large component of the catch (over 35t/yr. were recorded in the mid-1980s), but it is a slow-growing and longer lived species (maximum age about 29 years), and is thought to be dependent on flow rates but to respond much more slowly than Greenback Flounder (maximum age about 7 years). However, if the ecosystem recovers as expected, Black Bream will also be likely to increase in proportion of the catch, and may be eventually classified as a 'main retained' species, using the MSC 5% of catch threshold.

The main bycatch in the LCF comprises small individuals of the retained species (which are returned to the water), with a number of other species (including some ETP species) that are caught in only very low numbers. Although there are very limited independent observational data on bycatch, the fishery is considered to occasionally catch and retain permitted species of crabs, shrimps, rays, skates, sharks, as well as the finfish (ESD Report, draft). However, apart from the finfish, these other species are caught only in negligible numbers.

Detailed information on bycatch is limited to observations on retained and discarded fish species quantified in one study. This study, considering net fishing only, found that 26% (by abundance) of the total catch comprised discards. These comprised 21 species in total, with negligible numbers of 12 species of non-target fish and crustaceans, one pelican and one cormorant. Three of the species were retained as non-target but retained species: Australian Salmon, Jumper Mullet and Congolli, but they collectively comprised only about 6% of the total numbers in the observed catches. About 28% of all animals discarded were alive, although the level of post-release mortality for all the species involved is highly uncertain. Even so, none of these discard species display any particular vulnerability to population impacts from the fishery, and based on this study, it would appear that there are no 'main' bycatch species that can be identified (in MSC terms) as significantly impacted by this fishery.

ETP species known to be occasionally taken in the LCF include Australian Pelican, Little Black Cormorant, Short- and Long-necked Turtle, Murray Crayfish, Freshwater Catfish, and Silver Perch. Only very limited numbers are caught, and a high proportion are released alive. Other species which interact with the fishery (although not caught in the nets) include fur seals, sea lions, and other seabirds. While the provisioning of entrained species such as these is a recognized issue (in many fisheries), the extent of discards, and of scavenging direct from nets, is not considered to be at a level that would have any significant population consequences, given the small scale of this fishery and the infrequent interactions. An assessment of the risks of the fishery concluded that there were no species-specific risks to any of these species from the operations of the fishery that could be categorized higher than low, and most were negligible (ESD report draft).

In relation to bird species (see below) a specific assessment of risks to birds conducted for this assessment by a workshop of competent experts concluded that no risks were greater than negligible (Stoklosa, 2013). Key aspects of this include the lack of fishery impacts on the Fairy Terns (nationally classified as Vulnerable) and Hooded Plover (nationally EPBC listed marine species), both of which nest in the dune systems of the Coorong area. Physical disturbance of nests by vehicles, pets, and recreational activities, as well as direct predation by cats, dogs and foxes, are considered to be the main pressures on these two species, populations of which are greatly reduced. The assessment of risks from the LCF indicates that there is very little likelihood of either physical interaction (vehicles accessing/using the beaches) or trophic interaction (direct or indirect competition for species the birds prey on), and thus the risks of the LCF to these two species of birds are considered negligible. A list of the important bird species that occur in the Coorong, and their conservation status is attached at Annex 2.1.

In the estuarine/marine component of the ecosystems (the Coorong on the ocean side of the barrages), 49 species of fish have been described, including diadromous species such as the culturally-significant Congolli, commercial and recreationally-fished Yellow-eyed Mullet and Black

Bream, and Small-mouth Hardyhead which is an important prey item for many of the birds in the region (Phillips and Muller, 2006). Macroinvertebrate taxa occurring in the intertidal marshes and mudflats include Amphipoda, Oligochaeta, polychaete worms (e.g. *Nephtys australiensis*, *Simplesetia aequisetis*, *Capitella* spp.) and bivalves such as *Arthritica helmsi*. A calcareous tubeworm (*Ficopomatus enigmaticus*) and brine shrimp (*Paratemia zieziana*) are also considered to be characteristic of parts of the Coorong (Keith et al., 2013).

Primary Ecosystem Features

The extent and environmental importance of the wetland complex has been recognized by Australia's designation of the CLLMM as a Site of International Importance under the Ramsar Convention (the Convention on Wetlands of International Importance). The CLLMM meets eight of the nine Ramsar criteria (only one of which is required for a wetland to be inscribed on the Ramsar List). The CLLMM also meets all five Ramsar criteria that are relevant to birds. In particular, the CLLMM supports 15 threatened species, 15-27 species that regularly breed at the site, 57 species that are listed on migratory bird agreements, 56 species that use the site for molting, >20,000 waterbirds every year, and >1% of the flyway population size for 10 waterbird species (O'Connor et al., 2012). Bird diversity is therefore a paramount ecological feature of this region.

The Fairy Tern (*Sterna nereis nereis*) listed as Vulnerable under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and in the IUCN Red List of Threaten Species. The global population (of about 4,000 individuals) has undergone a substantial decline over the past few decades and this decline is expected to continue at a substantial rate, as there is no evidence that the threats affecting this species are abating. Surveys in 2011-12 detected Fairy Terns across all regions of South Australia including Kangaroo Island. However, the birds were primarily located in two regions — south-east of South Australia including the Coorong, and the coastline of Eyre Peninsula including the West Coast and a number of neighboring offshore islands. There has been a downward trend in colony size and in the number of colonies within each region over time. Of the colonies that have been located, 56 % (5 colonies) succeeded in rearing chicks to independence, 33% (3 colonies) failed due to fox predation and 1 colony failed due to human disturbance.

At state level, survival of the Fairy Tern is primarily threatened by human disturbance but mammalian predators and water inundation are also threats. Remaining habitat is therefore at risk of disturbance by inappropriate water management. The impacts of altered hydrology may be local (e.g. within the Coorong), but the relationship between locally impacted populations and the state-wide population can result in local declines leading to state-wide declines. Consequently, inappropriate water management is viewed as a major threat to Fairy Terns in South Australia (DEWNR, 2012b).

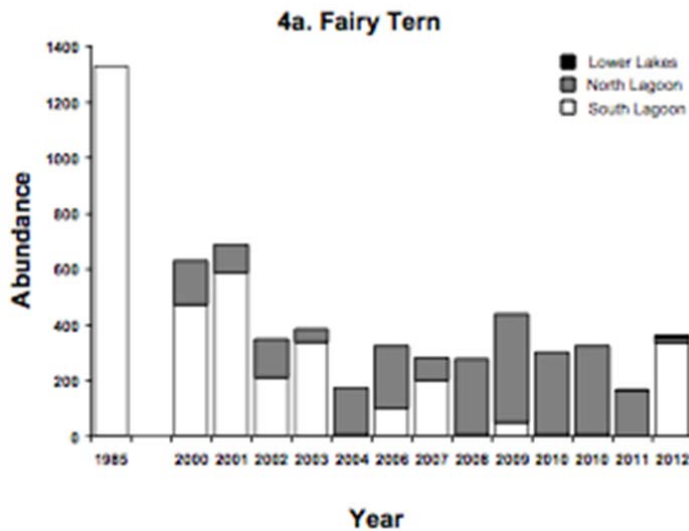


Figure 18. Abundance of Fairy Terns (*O'Connor et al 2012*)

Fairy Terns have progressively declined in abundance in the Coorong region since the 1980s. They are considered to depend heavily on Small-mouth Hardyhead as a food source, which is the predominant fish in the hypersaline South Lagoon (*O'Connor et al., 2012*). The LCF has no had fishing activities in or near South Lagoon until recently. Reducing salinities associated with improved water management have provided for the recent range extension of Greenback Flounder to South Lagoon and subsequent fishing in 2011-12, but this is highly unlikely to have any form of direct or indirect impact on populations of the Small-mouth Hardyhead.

3.3.3 Critical Aspects

3.3.3.1 Water flow

The health of the CLLMM ecosystems is critically dependent on water flows in the river and the (related) condition of the Murray Mouth (sand bar open or closed to ocean waters). Regular freshwater flows keep the mouth open and provide the drivers and cues for ecological responses of the flora and fauna, and maintain salinity levels broadly within ranges that the species utilising the ecosystems are adapted to withstand.

The three key aspects of environmental management needed to maintain the ecosystems of the CLLMM in healthy conditions are:

- a. maintain water flows in the river, related principally to climatic factors across eastern Australia, water regulation in the river (through water regulation devices – weirs and dams) and water abstraction directly or indirectly from the upstream reaches of the river and from the lower lakes (for agriculture/irrigation);
- b. management of the barrages, to maintain flow from the lakes into the Coorong;
- c. dredging of the river mouth, when droughts prevent natural flows from keeping the entrance open, to allow ocean waters to retain a salinity gradient along the Coorong that permits the natural structure and function of the habitats and species.

The LCF has no specific role/responsibilities in any of these management issues, other than to ensure that management decisions in relation to each of these three matters are made in the light of the fishery issues, including the dependency of the natural species diversity and functioning that relate to the LCF.

3.3.3.2 Bird interactions

As a site of international importance with a focus on birds and their habitats, any interactions between the fishery and the important birds that use the CLLMM for any part of the life history are important. This involves not only birds that are nationally identified as ETP species, but also those that are identified under Australia's international agreements with other nations and obligations under the Ramsar Convention.

The direct and indirect interactions between the fishery and all of the birds considered important under both national and international regulation and agreements are considered to be low to negligible. However, this understanding is constrained by limitations in the knowledge base about fishery-bird interactions, and the maintenance of an ongoing observer program designed (within the scale of this fishery) to provide routine fishery-independent data on the type and extent of bird interactions will be an important feature of future activities.

3.3.3.3 IUCN Critically Endangered Ecosystem

The estuarine/marine area that constitutes the Coorong (North and South Lagoon; about 200 km²) has been recently proposed to be Critically Endangered, using the IUCN protocol for assessment of ecosystems established by Keith et al., 2013. Central ecosystem level issues are considered to be:

- the small size and uniqueness (globally) of the system, inferring a high level of vulnerability to present-day and potential future pressures;
- the vulnerability of the habitats to river flow drivers and salinisation in South Lagoon;
- the >80% loss of *Ruppia* (seagrass) abundance from the system, and the loss (local extinction) of one of the *Ruppia* species;
- the likelihood of future ecosystem collapse based on water flows/provisions under four of six different conditions of climate and human development (such as levels of water abstraction).

The health of the Coorong ecosystem (Keith et al., 2013) is proposed to be characterised by a large number of marine and estuarine fish (e.g. Yellow-eyed Mullet, Mulloway, Black Bream and Australian Salmon). In addition, characteristic birds of a healthy Coorong are considered to include cormorants, waterfowl, migratory waders and the Australian White Ibis (*Threskiornis molucca*). Amphipod and polychaete species are considered to be characteristic of healthy infaunal assemblages, and the macrophyte *Ruppia tuberosa* needs to be present as a component of a healthy Coorong.

Of these characteristics, the LCF directly influences the fish species, and while not considered to create a significant impact on individual populations, there is a potential for effects when fish are in high abundance (and hence most targeted by the fishery). The extent of LCF impact is probably not significant enough to have a major impact on the populations being fished, provided that catches are maintained within fishery management reference points. So while the ecosystem as a whole is under extreme stress, the contribution of the LCF to that is probably insignificant relative to the major impacts of water flows discussed above.

3.3.3.4 Capacity to Recover

The CLLMM is a highly dynamic interacting set of individual habitats, naturally variable in the face of climatic conditions and human-induced changes in local and upriver conditions. A key aspect of such dynamic estuarine and coastal water ecosystems is, when high water flow returns to the system, the ability of the flora and fauna to recover from the severe stress that low flow conditions imposes, and their ability to persist in the long term in the face of such dynamics. Any pressures imposed by the LCF on the capacity of the ecosystems to recover should also therefore be negligible. Otherwise the fishery may be considered to be imposing a long-term pressure on recovery, and this may have long-term negative consequences for the ecosystem as a whole.

Recent analysis of the fish fauna has shown a slow long-term decline in species diversity, related to the (apparent) gradual decline of several fish species that are targeted by the LCF (Black Bream, Greenback Flounder, Mulloway). The declines are thought to be linked to reductions in abundance of the older individuals in the population, effectively truncating the age-structure of the populations to the younger individuals, and shifting the fisheries towards the faster-growing, shorter-lived, and smaller-bodied individuals and species. While this has little apparent impact on day-to-day productivity for the fishery, there are important potential long-term consequences for the populations as a whole, if populations are indeed being reduced to smaller fish, and for the fisheries, if the catch is progressively increasingly being composed of fast-growing and smaller fish species.

The truncation of population structure is a typical impact of fishing (both recreational and commercial), but in the case of the Coorong, may also be created by the dynamics of low-flow conditions (the frequency of low-flow conditions may interact with the longevity of the fish in the population). Irrespective of the cause, the truncation of population structure may be important in limiting the pace and extent of recovery from the stress of low-flow conditions, and may be of importance also for indirect trophic impacts in the ecosystem (through impacts on predation and predators linked to the older-aged fish and their distribution across the Coorong).

Any actions of the fishery that interfere with the natural recovery of age-based structure of a fish population after a period of low-flows may therefore be a significant impact on both the long-term health of the fish population itself as well as on the low-flow recovery of the ecosystem (in terms of structure and function). There are no control mechanisms for the fishery that take this into account (such as maximum size/age based limits relative to environmental conditions) and is a matter that will require careful further analysis, and possibly corrective action designed to avoid further long term declines in biodiversity of the fish fauna and promote recovery of more natural population structures.

3.4 Principle Three: Management System Background

3.4.1 Area of operation of the fishery and under which jurisdiction it falls

The LCF in South Australia includes freshwater, estuarine and marine waters of the lower Murray River Lakes (Lake Alexandrina and Lake Albert), the Coorong Lagoons and the coastal marine waters adjacent to the Sir Richard and Younghusband Peninsulas out to three nautical miles from the low water mark (see Figure 1 above).

The LFC operates within an area designated as wetland of international importance under the Ramsar Convention, and within the boundaries of the Coorong National Park, an area recognized primarily for its wetland habitats and importance for a variety of migratory waterbirds.

The ecosystem within which the LCF operates is very dynamic. It is influenced by high natural variation in river flooding and periods of extended drought. This presents challenges to

management, with respect to matching total harvesting capacity and exploitation rates with annual changes in fish stock abundance, particularly during extended periods of drought.

The LCF is a single jurisdiction fishery, under the management of the Australian State of South Australia. While a Native Title claim was registered by the Ngarrindjeri people with the Native Title Tribunal in 2000 over an area of land and water including the waters of the LCF (Ngarrindjeri Tendi et al., 2006), this claim has not yet been processed. Indigenous fishing is conducted and managed as recreational fishing and the current Management Plan for the fishery (Sloan, 2005) provides for teachers and students at “Camp Coorong” to access fish stocks from the LCF using traditional methods for educational purposes.

3.4.1.1 Particulars of the recognised groups with interests in the fishery

There are three main groups that have an interest in the LCF:

- commercial fishers;
- recreational fishers; and
- indigenous fishers.

The *Fisheries Management Act 2007* (FMA, 2007) recognises commercial, recreational and aboriginal traditional fishing as separate activities.

There are 36 commercial fishing licences issued for the LCF owned by 33 operators. The fishery is estimated to have directly created the equivalent of 62 full time positions in 2010/11 (Econsearch, 2012). The interests of commercial fishers are represented by the Southern Fishermen’s Association (SFA) and the Goolwa pipi Harvesters’ Association (GPHA).

The SFA was established in 1939 to represent the interests of commercial Lakes and Coorong Fishers. Members of the SFA hold 29 of the 36 LCF licences. The GPHA was established in 2010. Members of the GPHA hold 7 of the 36 LCF licences.

Recreational fishers in the area of the LCF can use a range of gear types and are subject to various area and gear restrictions. In particular, the number of recreational mesh nets is limited. Currently there are 878 such nets registered for use in the waters of the LCF. These are subject to special conditions, are non-transferable and no new registrations can be issued. These recreational rights will be gradually phased out by the Department of Primary Industries and Regions South Australia (PIRSA, 2011). The South Australian Recreational Fisheries Advisory Council (SARFAC) is the recognised peak body, whose role is to advise government on recreational angling issues and to advocate on behalf of recreational anglers in South Australia.

The FMA 2007 allows for the development of an aboriginal traditional fishing management plan, under Indigenous Land Use Agreements (ILUA). However, the local Ngarrindjeri people have not sought to develop an Indigenous Land Use Agreement with the South Australian Government. Instead they have filed a Native Title Claim with the Federal Government. This claim has not yet been considered.

3.4.2 Details of consultations leading to the formulation of the management plan

The Management Plan for the South Australian Lakes and Coorong Fishery (Sloan, 2005) has been in place since 2005. The Plan was developed by the Inland Fishery Management Committee (IFMC) after several years of consultation with key stakeholder groups and a public consultation process. The Plan was prepared under the powers contained in section 14 of the *Fisheries (Management Committees) Regulations 1995* and under the then *Fisheries Act 1982*. At the time of the Plan’s development the IFMC was the principle forum established to allow for stakeholder input to the

management of South Australia's inland fisheries, including the Lakes and Coorong Fishery. Its membership comprised a Government fisheries manager, a government scientist, commercial fishers and recreational fishers, and it was chaired by an independent Chairperson appointed by the Minister. Non-government appointments were made after calling for applications from relevant parties and interest groups and undergoing a transparent selection process involving relevant stakeholder representation (PIRSA, 2005).

In 2007 the 1982 Act was replaced by the FMA 2007. The new Act removed the provision for Management Committees and the IFMC was subsequently disbanded.

A new Management plan reflecting the requirements of the FMA 2007 is being developed for the LCF by the Fisheries Council of South Australia (the Fisheries Council). The Plan is expected to be implemented by June 2014.

Section 44 of the FMA 2007 prescribes procedures that must be followed in the development of management plans, including procedures related to public consultation. Section 44 requires the Fisheries Council to:

- issue a public notice of the intention to develop a management plan;
- seek the views of a representative of all signatories to any relevant indigenous land use agreements (noting that none are currently in place for the LCF);
- refer the draft management plan to the Minister, to the signatories to any relevant indigenous land use agreement, to any relevant advisory committee and any relevant public authority affected by the plan;
- advertise the availability of the draft plan for public comment;
- invite written submissions on the plan; and
- hold a public hearing (this can be dispensed with subject to Ministerial approval).

Under the FMA 2007 the new draft management plan will be subject to a minimum period of two months public comment and the Fisheries Council will hold a public hearing to discuss the draft plan. Written submission must be made publicly available. The Fisheries Council has appointed a Steering Committee to oversee development of the Plan. The Committee is chaired by a member of the Council and includes the executive officers of the SFA and the GPHA, two other industry representatives, a PIRSA fisheries manager and a scientist from SARDI.

3.4.3 Arrangements for on-going consultation with interest groups

Section 20 of the FMA 2007 provides for the establishment of advisory committees to provide advice to the Minister or the Fisheries Council on matters related to the administration of the Act. The minister is responsible for approving the establishment of such committees. No such committee exists in relation to the LCF.

Apart from consultation on management plans, no formal requirements currently exist in the FMA 2007 to consult with the broader community concerning ongoing fisheries management decision-making. However, as a matter of practice, PIRSA Fisheries consults with key stakeholder groups and the broader community through public comment processes when significant management changes or developments are being considered. The assessment team heard that there is now a strong organizational culture in PIRSA for consultation with a strong propensity to work with industry associations, in particular. PIRSA's approach is also inclusive of other stakeholders. For example the ESD risk assessment workshop held as part of the new management plan development process was open to and attended by environmental non-government organizations and indigenous representatives.

The Lakes and Coorong Consultative committee (LCCC) is a central platform for consultation on the LCF. While the LCCC is not a formal advisory committee established under the FMA 2007, the LCCC was established by the SFA in order to provide a forum to discuss and develop a range of matters associated with the management of, provision of services to and provide opportunities for community engagement in the LCF (SFA, 2013a). Membership of the Committee includes:

- A chair
- The executive committee of the SFA representing industry
- The PIRSA LCF fishery manager
- The PIRSA Regional Compliance Manager
- The SARDI Estuarine Fisheries program leader
- A representative from the Alexandrina Council
- A representative from the Coorong District Council
- A member of the region's Aboriginal community
- A member of the conservation community with an interest in the region
- A representative from the National Parks and Wildlife Service

3.4.4 Details of non-fishery users or activities which could affect the fishery, and arrangements for liaison and cooperation

The lower Murray lakes and Coorong region is situated at the tail end of the largest freshwater catchment in Australia, the Murray-Darling Basin, where the river system meets the Southern Ocean. The entire catchment spans across four state management jurisdictions and has been significantly modified since European settlement because of its importance in supporting human existence, agriculture and industrial development. The introduction of various water flow management measures, water extraction systems, the associated barriers to fish migration, the proliferation of a number of exotic fish species and pollution from agricultural run-off have collectively served to modify the structure, productivity and function of the entire ecosystem.

The Murray Darling Basin Authority (MDBA) was established in December 2008 and assumed responsibility for all of the functions of the former Murray–Darling Basin Commission. The MDBA is made up of six members who are supported by an office of around 300 staff.

In February 2011 the Council of Australian Governments re-established the Murray–Darling Basin Ministerial Council as the Legislative and Governance Forum on the Murray–Darling Basin. Membership of the Council comprises Ministers with responsibility for the Murray–Darling Basin, including the South Australian Minister for Water and the River Murray, currently the Hon. Ian Hunter, MLC.

The Living Murray (TLM) program was established in 2002 in response to evidence showing the declining health of the River Murray system. It is a partnership of the Queensland, NSW, Victorian, South Australian and Australian Capital Territory governments and the Australian Commonwealth Government (through the MDBA). The program's 'first step' started in 2004, and focused on recovering 500 gigalitres of water for the River Murray specifically for the benefit of plants, animals and the millions of Australians it supports. By returning water to the environment, and by building infrastructure such as regulators, weirs and fishways, The Living Murray is helping to ensure a healthy, working Murray River into the future.

The TLM focuses on maintaining the health of six icon sites along the river. The icon sites have been chosen for their high ecological, cultural, recreational, heritage and economic value. Each Icon Site has an Environmental Watering Plan, which identifies the ecological objectives and water

requirements for the site, and provides the framework for delivering environmental flows. South Australia has all or part of three of the icon sites. These are:

- Chowilla Floodplain and Lindsay-Wallpolla Islands
- Coorong, Lower Lakes and Murray Mouth (CLLMM)
- River Murray Channel (Department of Environment, Water and Natural Resources (DENWR), 2013)

A community advisory panel has been established for the Murray Futures Coorong, Lower Lakes and Murray Mouth Recovery Program and CLLMM Icon Site program. Mr. Garry Hera-Singh, Chairman of the SFA, and a Lakes and Coorong fisher is a member of that panel. The aim of the panel is to integrate community values and opinion into the on-going management of the CLLMM region by providing advice about, and a community perspective on, projects and management actions proposed for the region under the Murray Futures and TLM programs. Panel members meet quarterly on a voluntary basis to help promote and facilitate effective communication between the government, communities, traditional owners, industry and businesses, and other interest groups. The key responsibilities of panel members are:

1. Through existing networks, or by developing networks, represent a range of community and industry views in terms of the environmental, economic, and social impacts of plans, proposals, or actions within the CLLMM site.
2. Assist the implementation of the Murray Futures CLLMM Program and the Living Murray Icon Site management by disseminating information within communities in a way that promotes clear understanding of the context and rationale of decisions, and enhances community ownership and adoption. (DENWR, 2012)

The FMA 2007 requires that insofar as the Act applies to the River Murray, the administration of the Act must seek to further the objects of the *River Murray Act 2003* and the Objectives for a Healthy River Murray under that Act, and the *Marine Parks Act 2007*. These objectives are reflected in the Management Plan for the LCF.

Of particular relevance to the LCF is the Native Fish Strategy implemented in 2004 by the then Murray-Darling Basin Commission. The vision of the Native Fish Strategy is to ensure that viable fish communities and populations are sustained throughout the rivers of the Murray-Darling Basin. Native fish species in the Basin have suffered serious decline in both distribution and abundance since European settlement. A variety of factors have contributed to this decline, including habitat deterioration, predation and competition from alien fish, pollution, reduction of water quality, and human-made barriers to fish movement. The strategy provides guidance for investing funds (but is not a source of funds), and assigning priorities, responsibilities and evaluation procedures for fish research and development programs; on-ground implementation programs; construction programs for fishways; and community education and awareness programs.

A partnership approach is a key aspect of the Native Fish Strategy. Advice on program delivery is provided by the Implementation Working Group (IWG), which is made up of agency representatives from each of the jurisdictions in the Murray-Darling Basin, including South Australia. A Community Stakeholder Taskforce also helps guide the Native Fish Strategy by allowing a community perspective to be provided on communication and engagement activities. Various working groups deal with specific issues in implementing the Native Fish Strategy (Murray-Darling Basin Authority, 2013). PIRSA provides the Native Fish Strategy Coordinator position for South Australia.

3.4.5 Details of the decision-making process or processes, including the recognised participants

The FMA prescribes the functions and powers of the Minister, the Director of the PIRSA Fisheries Division and the Fisheries Council of South Australia and provides for the Minister to delegate his/her powers.

The Minister is ultimately responsible for the adoption of management plans for South Australian fisheries, including the LCF. The Minister must, within 12 sitting days after adopting a management plan, cause copies of the plan to be laid before both Houses of the South Australian Parliament. As discussed above, the Fisheries Council is responsible for developing the management plan and for providing it to the Minister for approval and, in turn, it is advised by a management plan steering committee.

Day to day decision making on fisheries management, including implementation of management plans, lies with PIRSA Fisheries Division. The South Australian Research and Development Institute (SARDI), a research division of PIRSA, plays a central role in the provision of research services to PIRSA-managed fisheries.

While the LCCC does not have a decision making role in respect of the LCF it plays an important role in facilitating information sharing between the fishing industry, the decision-makers and other stakeholders under PIRSA's Co-management framework. The role and composition of the LCCC has been described under section 3.5.4.

The Fisheries Council of South Australia

The Fisheries Council's main purpose is to prepare and review management plans, promote the co-management of fisheries, promote research, education and training in relation to fisheries and their management (Fisheries Council of South Australia, 2013). Section 16 of the FMA 2007 specifies the functions of the Fisheries Council as follows:

- (a) to prepare management plans as required under this Act;
- (b) to conduct reviews of management plans;
- (c) to promote the co-management of fisheries;
- (d) to promote research, education and training in relation to fisheries and the management of fisheries;
- (e) to advise the Minister on the management of aboriginal traditional fishing, commercial fishing and recreational fishing;
- (f) to advise the Minister about fees to be paid in connection with fishery authorities;
- (g) to advise the Minister on the application of money in the Fund;
- (h) to advise the Minister on State-wide policies in relation to fisheries management and research;
- (i) to advise the Minister on matters relating to intergovernmental agreements and arrangements related to fisheries or fishing;
- (j) to advise the Minister on issues related to the allocation of access to aquatic resources in particular fisheries;
- (k) to prepare or promote codes of practice on best practice concerning matters of relevance to holders of fishery authorities;

- (l) to carry out such other functions as may be assigned or delegated to the Council by the Minister.

Membership of the Fisheries Council is expertise based. Section 11(5) of the Act specifies membership must comprise expertise in the areas of:

- (a) commercial fishing and the processing of aquatic resources;
- (b) recreational fishing;
- (c) research and development relevant to the use of aquatic resources;
- (d) conservation of aquatic resources;
- (e) socio-economics;
- (f) business; and
- (g) law.

PIRSA

The Fisheries Division of PIRSA is responsible for day-to day management of both commercial and recreational fishing in South Australia. The role of the PIRSA Fisheries Division is to ensure:

- maximum economic gain from the resource
- that the resource is shared equitably amongst all user groups (including recreational and commercial fishers)
- the long-term sustainability of the commercial and recreational fishing industries whilst protecting biological diversity and maintaining essential ecological processes and life-support systems

PIRSA Fisheries Division is responsible for:

- fisheries management and planning
- licensing and permits
- services to ensure compliance with legislation for recreational fishers and the commercial fishing industry
- providing information and advice for anyone with an interest in fishing and our fisheries resource (PIRSA, 2013a).

PIRSA's decisions on fisheries management are guided by scientific research and advice from SARDI.

SARDI

Two of SARDI's Program Areas are relevant to the LCF. The Inland Waters and Catchment Ecology Science Program Area of SARDI undertakes research and development activities and provides scientific and technical advice across government, industry and the community about key issues in the conservation and sustainable management of freshwater dependent systems including native fish resources and habitats. These include developing the understanding of ecosystem processes, ecology and population dynamics of the freshwater and estuarine fishes, molluscs and crustaceans and their environment, and ecology of freshwater and riparian vegetation. Work is conducted in four subprograms:

- Climate and Catchment Ecology
- Fish Ecology

- Invasive Species
- Plant Ecology

Close links and collaborations with state and federal agencies, local universities, and community groups including the Murray-Darling Basin Authority, CSIRO Land and Water, PIRSA, DENWR and regional Natural Resources Management Boards have been established under this Program Area.

The Marine Environment and Ecology Science Program Area undertakes a wide range of research activities, including habitat mapping, environmental impact assessment, effects of trawling, seagrass ecology, ecophysiology and rehabilitation, reef health assessments, the ecology and management of human impacts on species including marine mammals, seabirds and sharks, performance assessment of marine parks, ecological modelling and marine pests. The program provides advice to government on the management of a range of marine environmental issues, particularly marine pests and threatened, endangered and protected species. The current subprograms are:

- Aquaculture Environment
- Benthic Ecology
- Environmental Assessment, Mitigation and Rehabilitation
- Marine Pests
- Threatened, Endangered and Protected Species

3.4.6 Objectives for the fishery (Resource, environmental, biodiversity and ecological, technological, social, economic)

The *Fisheries Act 1982*, which was in force at the time the 2005 Management Plan was developed, specified that the following objectives be pursued:

- a. ensuring, through proper conservation, preservation and fisheries management measures, that the living resources of the waters to which this Act applies are not endangered or overexploited;
- b. achieving the optimum utilisation and equitable distribution of those resources; and
- c. insofar as this Act applies to the River Murray, seeking to further the objects of the River Murray Act 2003 and the Objectives for a Healthy River Murray under that Act.

The Management Plan specifies the following management goals:

Goal 1: Sustainable harvesting of fisheries resources.

- a. Fishing is conducted at a level that maintains ecologically viable stock levels and protects fish stocks from overfishing;
- b. Sufficient biological and environmental information is collected and analysed to make informed management decisions; and
- c. For fish stocks that are determined to be operating outside of established reference levels, the fishery will be managed to promote recovery to ecologically viable stock levels, within agreed timeframes.

Goal 2: Optimum utilisation and equitable distribution of fisheries resources, within the constraints of sustainability imperatives.

- a. Maintain a flow of economic benefit from the fishery to the broader community through the wise use of Lakes and Coorong fisheries resources;
- b. Maintain equitable public access and recreational fishing opportunities;
- c. Provide opportunities for indigenous communities to access fish stocks for traditional purposes;

- d. Maintain equitable levels of commercial access and the regional development nature of the commercial fishery; and
- e. Sufficient economic information exists to make informed management decisions.

Goal 3: Minimise impacts on the structure, productivity, function and biological diversity of the ecosystem.

- a. Monitor any external impacts on fish stocks associated with broader environmental or ecosystem health;
- b. Minimise fishery impacts on by-catch species and the ecosystem;
- c. Avoid the incidental mortality of endangered, threatened and protected species; and
- d. Reduce the population size and ecological impact of non-native fish species.

Goal 4: Cost-effective and participative governance of the fishery.

- a. Promote cost-effective and efficient management of the fishery;
- b. Have regard to the range of social, cultural and wider community values attached to the fishery; and
- c. Promote compliance with management control (Sloan, 2005)

The *Fisheries Management Act 2007* specifies new objectives as follows.

1. "An object of this Act is to protect, manage, use and develop the aquatic resources of the State in a manner that is consistent with ecologically sustainable development and, to that end, the following principles apply:
 - a. proper conservation and management measures are to be implemented to protect the aquatic resources of the State from over-exploitation and ensure that those resources are not endangered;
 - b. access to the aquatic resources of the State is to be allocated between users of the resources in a manner that achieves optimum utilisation and equitable distribution of those resources to the benefit of the community;
 - c. aquatic habitats are to be protected and conserved, and aquatic ecosystems and genetic diversity are to be maintained and enhanced;
 - d. recreational fishing and commercial fishing activities are to be fostered for the benefit of the whole community;
 - e. the participation of users of the aquatic resources of the State, and of the community more generally, in the management of fisheries is to be encouraged.
2. The principle set out in subsection (1)(a) has priority over the other principles.
3. A further object of this Act is that the aquatic resources of the State are to be managed in an efficient and cost effective manner and targets set for the recovery of management costs.

For the purposes of subsection (1), ecologically sustainable development comprises the use, conservation, development and enhancement of the aquatic resources of the State in a way, and at a rate, that will enable people and communities to provide for their economic, social and physical well-being while—

- a. sustaining the potential of aquatic resources of the State to meet the reasonably foreseeable needs of future generations; and
- b. safeguarding the life-supporting capacity of the aquatic resources of the State; and
- c. avoiding, remedying or mitigating adverse effects of activities on the aquatic resources of the State, (taking into account the principle that if there are threats of serious or irreversible

- d. damage to the aquatic resources of the State, lack of full scientific certainty should not be used as a reason for postponing measures to prevent such damage”

The new management plan for the LCF will be made under the FMA 2007 and in accordance with these new objectives.

3.4.7 Outline the fleet types or fishing categories participating in the fishery

Currently there are 36 commercial fishing licenses in the LCF. Each licence has a variety of gear entitlements attached to it. The main methods used are mesh, swinger, hauling, drum and dab nets and cockle rakes and nets.

The number of recreational fishers is not limited however the use of mesh nets is restricted to the current holders of recreational mesh net registrations. A range of other measures apply to recreational fishing (see Section 3.5.10 below).

3.4.8 Details of those individuals or groups granted rights of access to the fishery, and particulars of the nature of those rights

The 36 LCF licences are owned by 33 operators. All licenses issued in the fishery are fully transferable. The *Fisheries Management (Lakes and Coorong Fishery) Regulations 2009* preclude the granting of any additional licences in the fishery.

The fishery retains an owner operator policy to ensure that those who understand the fishery and the environment are the ones who catch the fish. It is one of the many effort reduction methods the fishery maintains (SFA, 2013a). However, where a licence holder holds more than one licence for the LCF, the license holder must be the registered master on at least one of the licenses. License holders may nominate a relief master for up to 28 days each year.

In addition to fishing licences individual transferable quota has been allocated for Pipis. This quota is linked to the licence. Licences and quota are allocated under the FMA 2007 and regulations relating to those rights are set out in the *Fisheries Management (Lakes and Coorong Fishery) Regulations 2009*.

Under the existing arrangements licences are renewed annually. However under the new Management Plan being developed licences will be issued for either 5 or 10 years.

There are no recreational fishing licences in South Australia. However, as noted above, there is a limit on the number of recreational mesh nets that can be used in the LCF. These mesh net registrations are non-transferable and no new registrations can be issued.

3.4.9 Description of the measures agreed upon for the regulation of fishing in order to meet the objectives within a specified period. These may include general and specific measures, precautionary measures, contingency plans, mechanisms for emergency decisions, etc.

The commercial fishery is managed using a complex mix of input and output controls aimed at matching harvesting capacity with resource availability and controlling growth in aggregate harvesting capacity. The commercial fishery is subject to the following management controls:

- limited entry through a limit on the number of licences issued
- transferable licences

- transferable quota for Pipis
- a requirement for the operator to be present when fishing operations are undertaken
- a limitation of a maximum of two (2) agents / crew in any fishing operation
- only specified species are permitted to be taken by holders of LCF
- Gear entitlements are attached to licences
- Restrictions on the number, length, mesh size, drop, break strain and rope length of various net types
- Restrictions on the maximum number of cockle rakes, crab rakes, traps and razor fish tongs
- Restrictions on the length and number of hooks used for set lines
- A series of spatial and temporal closures are used to restrict catch levels and protect fish stocks during specific stages of their life cycle or to reduce gear conflict between the commercial and recreational sectors
- Minimum length size limits are in place for Mulloway, Pipis, Yellow eye Mullet, Greenback Flounder Black Bream, Murray Cod, Golden Perch and Australian Salmon
- A requirement to submit monthly logbooks to SARDI (PIRSA, 2011).

The 2005 Management Plan includes a harvest strategy which provides a strategic framework to guide annual decision-making on harvesting rates for all sectors of the fishery. Since the introduction of quota for Pipis, a separate and updated harvest strategy has been developed for that resource (PIRSA, 2012a).

A licence amalgamation scheme is in place to encourage structural adjustment in the LCF. Under this arrangement there is a limit on the amount of gear that may be endorsed on an individual licence upon licence transfer or amalgamation. Specific arrangements apply to licence transfers between members of a family. This scheme has allowed for limited structural adjustment to occur.

Section 79 of the FMA 2007 provides for the Minister to issue notices in response to emergency situations. Directions under this section of the Act can be put in place to prohibit specific fishing activity, over a specified period or to prohibit possession or control of a specified species during a specified period. Such directions can be issued for 12 months and can be extended for a further 12 months if necessary. While there are no examples of this power being used in the LCF, the Minister has exercised the powers in other fisheries when required.

The laws controlling recreational fishing activities are contained in the FMA 2007 and the *Fisheries Management (General) Regulations 2009* (see http://www.pir.sa.gov.au/fisheries/recreational_fishing for details). The rules and regulations are based on ecological and biological knowledge of fish stocks and the environment. They provide for:

- setting catch (bag and boat) and legal size limits for the fish that can be taken
- seasonal or total protection of some species
- total or seasonal closure of some areas to fishing
- restrictions on the number and type of gear that can be used when fishing for particular species
- registration of some gear, for example rock lobster pots and mesh nets
- the need for permits or exemptions to be able to undertake some activities, for example harvesting sea-grass and marine algae and collecting fish for broodstock or research.

A Recreational Fishing Management plan is being developed by a steering committee established by the Fisheries Council of South Australia and is expected to be completed in 2013. In addition, the

Fisheries Council is working with PIRSA and SARFAC to facilitate the development of a strategic plan for recreational fishing (Fisheries Council of South Australia, 2012).

3.4.10 Particulars of arrangements and responsibilities for monitoring, control and surveillance and enforcement

Compliance with management goals is a specified objective of the current management plan for the LCF. The Fisheries and Aquaculture Operations Group of PIRSA Fisheries Division has responsibility for monitoring, control and surveillance (MCS) in the fishery. The Group is comprised of Regional Operations Teams, Offshore Patrol Operations and the Intelligence and Strategic Support Team. These teams undertake compliance activities to educate fishers, deter opportunistic and financially motivated fishery related crimes and enforce rules and regulations.

Separate compliance plans for the net sector of the Lakes and Coorong Fishery and for the pipi Fishery are developed in consultation with fishery industry representatives. These Plans are risk based. Annual Scorecards, reporting on activity, effort and outcomes, are prepared for each of these fisheries and quarterly compliance activity reports are provided to the LCCC. This provides an opportunity to for the Committee to discuss compliance plans and for the fisheries officer to answer compliance related questions. From time to time a fisheries officer also attends meetings of the GPHA.

Compliance activities are conducted on land and at sea. These activities include checks for undersize catch during fishing operations, at landing points, at processors and in transit; education campaigns and ongoing one-on-one education sessions about regulations and operator responsibilities; checks that Catch and Disposal Records (CDRs) for Pipsis are completed; and covert surveillance.

PIRSA fisheries officers are responsible for enforcing regulations relating to both commercial and recreational fishers. Fisheries officers also engage actively in the development and review of fisheries management policy.

3.4.11 Details of any planned education and training for interest groups

All new entrants to the LCF are offered the opportunity to meet with a fisheries officer and to be briefed on the regulations in place in the fishery and their obligations. This has proved an effective mechanism for educating those fishers and has been well received by them.

An Operator User Guide has been developed for the LCF which is intended to assist new entrants and refresh the knowledge of existing operators, The Guide describes the permitted commercial devices by area in the LCF, identifies closed seasons and areas, fisher obligations with respect to general catch reporting, reporting interactions with protected species and for prior reporting of fishing activity, and permitted species.

The SFA has developed a Code of Practice (SFA, 2013b) to provide guidance to fishers about appropriate actions in relation to: the environment of the LCF; resource management; animal welfare, National Parks, reserves and private land; compliance; exotic species; fish kills; relations with other commercial fishers; interactions with recreational fishers; Indigenous heritage; assisting others; and. interactions with the public. In addition, the SFA provides advice to fishers on best practice approaches to specific issues in the fishery as they arise. For example, in early 2013, in response to reports of substantial numbers of undersize Mulloway being taken in the LCF, the SFA wrote to all licence holders encouraging the adoption of certain practices to minimise the catch and discard of juvenile Mulloway.

3.4.12 Description of fishery's research plan

The Management Plan includes a Strategic Research and Monitoring Plan. The Plan identifies a series of fishery-wide and species-specific research priorities which were to be "updated annually by the IFMC". As noted above, the IFMC has since been disbanded, and there does not appear to be a regular process of review of research priorities in place. Nevertheless, the Strategic Monitoring and Research Plan provides a broad overview of research requirements in the fishery.

Stock Assessment and Monitoring is one of six main components of the PIRSA management system for the LCF. A schedule of stock assessments has been agreed for the key species. Stock assessments conducted against this schedule are a central driver for identification of research gaps in relation to target species. Broader ecosystem research has been initiated by industry in acknowledgement of MSC requirements and by PIRSA or is conducted in response to external assessment of the fishery conducted under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

A current research proposal addressing structural adjustment in the net sector of the LCF has been submitted for consideration under the Tactical Research Fund of the Fisheries Research and Development Corporation. This proposal was developed by PIRSA in consultation with the SFA and the GPHA and endorsed by the LCF Management Plan Steering Committee.

3.4.13 Date of next review and audit of the management plan

The existing Management Plan includes a provision that it be reviewed in 2009. This did not occur. However, as noted above a new management plan is being developed in accordance with the requirements of the FMA 2007 and this effectively constitutes a review of the existing plan. It is expected that the new Plan will be finalised by 2014. Section 49(2) of the Act requires that a comprehensive review of management plans be conducted as soon as practicable after the fifth anniversary of the commencement of the Plan in order to determine whether the plan should be amended, replaced or reinstated without amendment.

4 Evaluation Procedure

4.1 Harmonised Fishery Assessment

There is no fishery in the Lakes and Coorong area that overlaps with this fishery. In South Australia and under the same management regime as the fishery in re-assessment, only the Spencer Gulf King Prawn Fishery is certified. However the prawn fishery operates in the Spencer Gulf of South Australia with a very different gear type. This is however a re-assessment of the Lakes and Coorong Fishery and therefore scores and rationales from the first assessment will be considered.

4.2 Previous assessments

A summary of any previous assessments of the client operations

The fishery was first assessed and certified in 2008. The fishery was certified with 30 conditions (22 under Principle 1, 6 under Principle 2 and 2 under Principle 3). At the 3rd annual surveillance audit Nine conditions have been closed out at this audit as a result of satisfactory achievement of the client's action plan leading to an outcome that would result in a score of 80 or more on the relevant indicator. At the 4th annual surveillance audit 7 more conditions in Principle 1 and 1 condition in Principle 2 were closed by the surveillance team.

Table 4.2. Summary of Previous Assessment Conditions

Condition	Closed? (Y/N)	Justification
<p>Condition 1 (Mulloway): A reliable assessment should be made of the extent to which the juvenile Mulloway within the Coorong lagoons and the adult assemblage found off the beaches and in the waters adjacent to the mouth of the Murray River outside the Coorong are interdependent so that a more complete understanding of the life history is available to support a reliable assessment as required under the 80 Scoring Guidepost for this indicator. Data should be collected and analyzed to provide reliable estimates of growth and size and age at maturity.</p> <p>This condition should be met by 2010.</p>	N	
<p>Condition 2 (Goolwa cockles): Reliable estimates of growth and of the size and age at which maturity are attained should be determined, together with a more detailed understanding of spatial distribution and recruitment processes. These life history parameters are necessary to support a more reliable assessment of the species as required under the 80 Scoring Guidepost for this indicator.</p> <p>This condition should be met by 2011.</p>	Y (4 th audit)	<p>A PhD project was initiated but has been abandoned. Parts of this work are now being undertaken at SARDI under an FRDC project, and also supplemented by the industry-supported ongoing catch sampling program. The FRDC project has been finalized and the findings have been presented to industry. Appropriate management strategies for the fishery have been proposed (Ferguson/SARDI PowerPoint data summary presentation, 27 September 2011). The recently developed fishery independent survey method provides a more robust index of relative biomass for pipi (Ward et al., 2010). The incorporation of a new Performance Indicator into the new management plan, which is due in 2013, has been suggested. Pipi</p>

		have been over-exploited, however a recovery strategy is in place and there are indications that these are working. TACC constrained catches in 2009-10, 2010-11, and commercial CPUE as well as fishery independent biomass increased in 2009-10 and 2010-11. A draft harvest strategy has been developed and released shortly for industry input. The Harvest Strategy contains biological and economic considerations as performance indicators and a set of decision rules for TACC setting.
<p>Condition 3 (Mulloway): An improved index of abundance, with finer temporal and spatial resolution, should be developed (to supplement existing indices) that is less likely to be influenced by temporal/spatial changes in fishing operations or other factors, such as environmental variables. Note that (1) existing indices of abundance should be maintained as these have been established as the indicator variables that are calculated and compared against reference points to trigger an appropriate management response; and (2) the refinement of existing fishery-dependent indices of abundance may require the collection of additional and more detailed spatial and environmental data by each type of fishing gear to enhance the catch and effort data currently supplied by fishers and will require appropriate statistical analyses of those data. This is in line with the requirements of the 80 Scoring Guidepost.</p> <p>This condition should be met by 2010.</p>	Y (4 th audit)	The full formal stock assessment has been completed (Ferguson and Ward, 2011). SFA already implemented targeted catch sampling of length data in the beach fishery. For outcomes of the stock assessment see details under Principle 1 summary.
<p>Condition 4 (Golden Perch): An improved index of abundance with finer temporal and spatial resolution should be developed (to supplement existing indices) that is less likely to be influenced by temporal/spatial changes in fishing operations or other factors, such as environmental variables as required under the 80 Scoring Guidepost for this indicator. (See the note appended above to Condition 3 for Mulloway)</p>	N	

<p>This condition should be met by 2010.</p>		
<p>Condition 5 (Goolwa cockles): An improved index of abundance should, with finer temporal and spatial resolution, be developed (to supplement existing indices) that is less likely to be influenced by temporal/spatial changes in fishing operations, distribution of cockles, or other factors, such as environmental variables. (See the note appended above to Condition 3 for Mulloway) The potential that catch per unit of effort may be sustained (i.e. that CPUE is hyperstable) through movement of fishers to new sections of beach needs to be accounted for by appropriate collection and analysis of data as required under the 80 Scoring Guidepost for this indicator.</p> <p>This condition should be met by 2012.</p>	<p>N</p>	
<p>Condition 6 (Yellow-eye Mullet): An improved index of abundance with finer temporal and spatial resolution should be developed, as required under the 80 Scoring Guidepost for this indicator (to supplement existing indices), that is less likely to be influenced by temporal/spatial changes in fishing operations or other factors, such as environmental variables. (See the note appended above to Condition 3 for Mulloway).</p> <p>This condition should be met by 2010.</p>	<p>Y (4th audit)</p>	<p>The ERA found that the risk of current harvest strategies and catches is Low. As a low priority species within the stock assessment system (relative to the other more urgent stock issues in the fishery), Yellow-eye Mullet will have stock status reports for next 3 years, not stock assessments. If the stock status report for 2012 is satisfactory, and has no significant risks to status identified, therefore this condition was closed out.</p>
<p>Condition 7 (Mulloway): The influence of freshwater outflows and other environmental variables on the abundance and distribution of Mulloway should be ascertained, and their implications for management considered as required under the 80 Scoring Guidepost for this indicator.</p> <p>This condition should be met by 2010.</p>	<p>Y (4th audit)</p>	<p>The work on the CCLAM project 'Flow-related effects on fish and fisheries ecology in the Coorong, South Australia' has been finalized and the draft report was submitted to FRDC. The program aimed to evaluate the ecological trade-off for different water management scenarios as well as different future climate scenarios for the Murray-</p>

		Darling Basin. Therefore this condition was closed out.
<p>Condition 8 (Goolwa cockles): The influence of freshwater outflows and other environmental variables on the abundance and distribution of Goolwa cockles should be explored (either qualitatively or quantitatively), and their implications for management considered as required under the 80 Scoring Guidepost for this indicator.</p> <p>This condition should be met by 2011.</p>	Y (4 th audit)	The PhD project has been abandoned, but the data has been supplied to SARDI. Further data was being gathered through the FRDC/SARDI project through industry-supported but fishery independent sampling. The CCLAM freshwater influence project report has been finalized and the draft report was submitted to FRDC (see Condition 7). Therefore this condition was closed out.
<p>Condition 9 (Yellow-eye Mullet): The influence of environmental variables and catch, CPUE, growth, etc. of Yellow-eye Mullet should be explored (either qualitatively or quantitatively) as required under the 80 Scoring Guidepost for this indicator.</p> <p>This condition should be met by 2010.</p>	Y (4 th audit)	As for conditions 7 and 8.
<p>Condition 10 (Mulloway): The 80 Scoring Guidepost for this indicator requires that good data be collected and made available on retained catch and discards to get a better understanding of mortality in the fishery. For this fishery, we are requiring the following activities to meet this goal:</p> <ol style="list-style-type: none"> 1. Processes should be implemented and data obtained to develop indices or measures of both annual recreational and indigenous fishing activity (catch, effort) that could supplement any future National Recreational Fishing Surveys. 2. Research should be undertaken and an estimate of release mortality determined. 3. Estimates of annual indigenous and illegal catches, and removals through mortality of discarded fish, need to be developed. 4. For each fishing gear and fishing sector, the fishery data (catch and effort) should be collected at a spatial and temporal resolution that is appropriate for subsequent stock assessment. 	Y (3 rd audit)	<p>The Programs collecting data are continuing (see explanations above). The final report of an FRDC funded project on “Gear interaction of non-targeted species in the Lakes and Coorong commercial and recreational fisheries of South Australia” was provided to SCS which meets client action plan item no.5. PIRSA compliance risk assessment reports have been completed and provided for audit assessment. The spatial and temporal scales have been clarified in the new logbooks as below.</p> <p>The Clients Action Plan</p>

This condition should be met by 2011.		has therefore been completed. #1 of the clients action plan for this condition is satisfied by: illegal catches can be crudely estimated from compliance activity reports (copies have been provided to SCS for verification); release mortality is estimated in the bycatch study; recreational catch can be adequately estimated from the sampling program in Jones 2009 and by 5 yearly PIRSA phone/diary surveys; #2: ILUA negotiations are ongoing, with outcomes beyond the control/influence of the client; #3: is satisfied by the ongoing 6-mo supply of compliance reports; #4: PIRSA has an audit of net sector by phone survey of catch routinely each 5 years; and this is also one component of the bycatch study; #6: catches from the ocean beach are now recorded in 5 km spatial blocks (was a single reporting block, now 13 blocks); Coorong lagoons have 7 reporting blocks (unchanged); the freshwater lakes are now reported in 4 blocks (was one block) - agreed between industry and SARDI (a map of the new reporting blocks for the lakes area has been provided to SCS for verification).
Condition 11 (Golden Perch): The 80 Scoring Guidepost for this indicator requires that good data be collected and made available on retained catch	N	

<p>and discards to get a better understanding of mortality in the fishery. For this fishery, we are requiring the following activities to meet this goal:</p> <ol style="list-style-type: none"> 1. Processes should be implemented and data obtained to develop indices or measures of both annual recreational and indigenous fishing activity (catch, effort) that could supplement any future National Recreational Fishing Surveys. 2. Research should be undertaken and an estimate of release mortality determined. 3. Estimates of annual indigenous and illegal catches, and removals through mortality of discarded fish, need to be developed. 4. For each fishing gear and fishing sector, the fishery data (catch and effort) should be collected at a spatial and temporal resolution that is appropriate for subsequent stock assessment. <p>This condition should be met by 2011.</p>		
<p>Condition 12 (Goolwa cockles): The 80 Scoring Guidepost for this indicator requires that good data be collected and made available on retained catch and discards to get a better understanding of mortality in the fishery. For this fishery, we are requiring the following activities to meet this goal:</p> <ol style="list-style-type: none"> 1. Processes should be implemented and data obtained to develop indices or measures of both annual recreational and indigenous fishing activity (catch, effort) that could supplement any future National Recreational Fishing Surveys. 2. Research should be undertaken and an estimate of release mortality determined. 3. The spatial and temporal resolution of commercial catch statistics should be improved and changes in the distribution of fishing or of cockles assessed appropriately. 4. Estimates of annual indigenous and illegal catches, and removals through mortality of released/sieved undersized cockles, need to be developed. <p>This condition should be met by 2011.</p>	<p>Y (3rd audit)</p>	<p>Each point in the Clients Action Plan has now been satisfactorily completed (see Conditions 2, 5 and 10).</p>
<p>Condition 13 (Yellow-eye Mullet): The 80 Scoring Guidepost for this indicator requires that good data be collected and made available on retained catch and discards to get a better understanding of mortality in the fishery. For this fishery, we are requiring the following activities to meet this goal:</p>	<p>Y (3rd audit)</p>	<p>All the points of the Clients Action Plan have now been completed (see Conditions 10, 11 and 12 above).</p>

<ol style="list-style-type: none"> 1. Processes should be implemented and data obtained to develop indices or measures of both annual recreational and indigenous fishing activity (catch, effort) that could supplement any future National Recreational Fishing Surveys. 2. Research should be undertaken and an estimate of release mortality determined. 3. Estimates of annual indigenous and illegal catches, and removals through mortality of discarded fish, need to be developed. 4. For each fishing gear and fishing sector, the fishery data (catch and effort) should be collected at a spatial and temporal resolution that is appropriate for subsequent stock assessment. <p>This condition should be met by 2011.</p>		
<p>Condition 14 (Mulloway): As required under the 80 Scoring Guidepost for this indicator, an appropriate monitoring program should be established to collect reliable size composition data from the fishery and to monitor changes in annual age/size composition and sex ratio.</p> <p>This condition should be met by 2010.</p>	Y (4 th audit)	The Ph.D. research on Mulloway was completed at the end of 2010. This condition is matched to the earlier structure of the reference points and stock assessment. The new stock assessment was also completed, and therefore this condition can now be closed out.
<p>Condition 15 (Golden Perch): As required under the 80 Scoring Guidepost for this indicator, an appropriate monitoring program should be established to collect reliable size composition data from the fishery and to monitor changes in annual age/size composition and sex ratio.</p> <p>This condition should be met by 2010.</p>	N	
<p>Condition 16 (Goolwa cockles): As required under the 80 Scoring Guidepost for this indicator an appropriate monitoring program should be established to collect reliable annual size composition data from the fishery and to monitor changes in these data.</p> <p>This condition should be met by 2010.</p>	Y (3 rd audit)	On the Clients Action Plan #1; the PhD program was terminated, but the data and information was provided to SARDI (see Conditions 2 and 8); #2 quota management is in place; #3 there is now a detailed population sampling program conducted each year (3 times each fishing year) on the stock.
<p>Condition 17 (Yellow-eye Mullet): As required</p>	N	

<p>under the 80 Scoring Guidepost for this indicator, an appropriate monitoring program should be established to collect reliable annual age/size composition data from the fishery and to monitor changes in age/size composition and sex ratio.</p> <p>This condition should be met by 2011.</p>		
<p>Condition 18 (Mulloway): As required under the 80 Scoring Guidepost for this indicator, the spatial/temporal resolution of commercial effort statistics, by gear type, should be improved and changes in the distribution of fishing or of the fish assessed appropriately.</p> <p>This condition should be met by 2010.</p>	<p>Y (3rd audit)</p>	<p>The Clients Action Plan is completed: #1 is completed (see Condition 10); #2 the updated logbooks are recording effort at an appropriate scale in spatial blocks and on daily/trip basis.</p>
<p>Condition 19 (Golden Perch): As required under the 80 Scoring Guidepost for this indicator, the spatial/temporal resolution of commercial effort statistics, by gear type, should be improved and changes in the distribution of fishing or of the fish assessed appropriately.</p> <p>This condition should be met by 2011.</p>	<p>Y (3rd audit)</p>	<p>The Clients Action Plan is completed: #1 has been completed, see condition 10 above; #2 new finfish logbooks are in operation; #3 is completed because the effort is assessed in the existing stock structure reports, and further, a new stock assessment will be completed late 2012.</p>
<p>Condition 20 (Goolwa cockles): As required under the 80 Scoring Guidepost for this indicator:</p> <ol style="list-style-type: none"> 1. The spatial/temporal resolution of commercial effort statistics should be improved and changes in the distribution of fishing or of cockles assessed appropriately. 2. The effort reported by commercial fishers should be modified to be in sufficient detail to allow determination of traveling time, and time spent locating, catching, sorting, and sieving. <p>This condition should be met by 2011</p>	<p>Y (3rd audit)</p>	<p>The Clients Action Plan is completed: #1 population distribution is assessed in 5km spatial blocks (see condition 16) and new logbooks have been implemented; #2/#3 the quota management system is in place, and all commercial fishers utilise the new logbooks; #4 the TACC setting system assesses fishing effort.</p>
<p>Condition 21 (Yellow-eye Mullet): As required under the 80 Scoring Guidepost for this indicator, the spatial/temporal resolution of commercial effort statistics, by gear type, should be improved and changes in the distribution of fishing or of the fish assessed appropriately.</p> <p>This condition should be met by 2011.</p>	<p>Y (3rd audit)</p>	<p>The Clients Action Plan has been completed: #1 is completed; #2 the effort is assessed and reported in the Stock Status reports, produced annually for this species; the new finfish logbooks have been agreed and finalized and will come into full effect at the end of 2011.</p>

<p>Condition 22 (Goolwa cockles): Provide a considered evaluation as to whether the reference points derived from the 1990/91 to 2000/01 data are appropriately precautionary. This is being required since the 80 Scoring Guidepost for this indicator requires an adequate reference point.</p> <p>This condition should be met by 2011.</p>	<p>Y (3rd audit)</p>	<p>Moving to quota has resulted in new types of reference points and supporting data collection (derived from fishery-independent population sampling), which are reviewed annually for setting the TACC. The new fishery Management Plan to be developed in July 2011 will result in review of all management reference and trigger points. This Condition is now redundant.</p>
<p>Condition 23: Prepare a technical review and assessment of the likely interactions between the fishery for the 4 assessed species and the likely predators on each species, focusing on spatial and temporal analysis of risks that the fishery may pose to key predators, particularly piscivorous birds, considering the age/size availability of the assessed species.</p> <p>Show evidence of support for enhanced levels of high-quality research on predator-prey relationships in the Coorong, and specifically on linkages with the commercially fished species so that main predators can be better understood.</p>	<p>Y (4th audit)</p>	<p>#1: There is a basic understanding of the trophic relationships in the Coorong, derived from trophic studies of the Coorong carried out under the CLLAMM project (CLLAMM 2009). An ERA has been completed but as reported in the previous surveillance, the ecological aspects are inadequate for a robust assessment of the risks, and it lacks detail on direct/indirect trophic interactions between the fishery and the birds and so does not meet the basic standard required of an ERA in this matter. The requirement for an improved risk assessment remains open, and is transferred to Condition 25, which deals with the requirement for risk assessment in a more specific and detailed manner.</p> <p>#2 the current surveillance was provided with minutes of the meetings with stakeholders within the framework of the LCC</p>

		<p>to discuss these issues about impacts and research needs, and this aspect of the condition has been completed.</p> <p>#3 a good scoping document for a research project on bird interactions with the fishery was developed but this has not been able to be commenced because a student could not be secured to conduct the project. This aspect of the condition is beyond the control of the fishery, and is transferred to Condition 25, where a specific and detailed response to the issue of risks from the fishery to birds is required.</p> <p>#4 this aspect was completed earlier.</p>
<p>Condition 24: The assessment team was not provided with any data or evidence about the type, level or potential impacts of bycatch in the fishery. However, the FRDC project on bycatch (FRDC SA05-29) now underway is noted as an important mechanism for securing a more objective set of data and knowledge on the bycatch. The client is required to provide evidence of the composition and magnitude of the bycatch in the fishery, completion of an assessment of the risks posed by such bycatch, the level of risks assigned, and establishment of monitoring programs for the catch of any key bycatch species determined as a result of the FRDC project.</p> <p>This condition should be met by 2011.</p>	N	
<p>Condition 25: In this Condition, the client needs to provide evidence of a cooperative process that involves the RAMSAR and National Park managers and other stakeholders to assess, and as necessary mitigate, the level of trophic-food web risks of the fishery (from bycatch or the removal of target species) to the ecosystem, habitats and non-target species of the three main fishery areas (freshwater, Coorong lagoons, ocean beach). This might be best achieved through a qualitative risk assessment process conducted cooperatively with the park and</p>	N	

<p>fishery management agencies after the FRDC bycatch project has been completed, in a manner consistent with that of the AFMA/CSIRO risk assessment methodology – Level 1 (4 years). Condition 24 will resolve concerns about the impacts of bycatch from the fishery.</p> <p>This condition should be met by 2010.</p>		
<p>Condition 26: Conditions 24 and 25 both apply. The FRDC project on bycatch now underway is noted as an important mechanism for securing a more objective set of data and knowledge on the bycatch.</p>	N	
<p>Condition 27: Conditions 23, 24, and 25 apply here.</p>	N	
<p>Condition 28: The assessment has not been provided with evidence that the physical impacts of the gear and operations of the fishery have been studied in habitats of importance to protected, endangered, threatened or icon species. The client is required to develop a process (such as risk assessment), in collaboration with the relevant agencies and ecological experts, to identify specific habitats that may be at risk of physical impacts (disturbance) from the fishery or its operations, then, if any moderate or higher level risks are identified, establish any relevant further investigations or mitigation procedures, practices etc. that may be agreed between relevant agencies, experts and the fishery. The client should then provide appropriate evidence that the level of the impact has been suitably identified, and that investigations or mitigations of this impact are underway.</p> <p>This condition should be met by 2011.</p>	N	
<p>Condition 29: Improve the understanding of by-catch and any impacts on non-target species (Conditions 23, 24, and 25 apply), and once this understanding is improved, introduce specific management measures to address any issues. This condition should be met by 2011.</p>	N	
<p>Condition 30: Conditions 25 and 28 apply.</p>	N	

Details of the conditions that the CAB proposes to carry over or reformulate within the re-certification

In total 13 conditions remain open after the 4th annual surveillance audit, 6 in Principle 1, 5 in Principle 2 and 2 in Principle 3 (Table 7). Three major and one minor non-conformance were addressed before the re-assessment of the fishery progressed. The 9 remaining conditions were carried over into the new assessment (see Table 7 below).

Table 7. Summary of Condition status and mapping of outstanding issues to Performance Indicators (PIs) of the Default assessment tree (DAT) - CR v1.3 (2013) used for the reassessment of the fishery.

Condition	Indicator	Species	Status of Condition/Non-Conformance	PI of DAT (CR v1.3)
1	1.1.1.2	Mulloway	Open, extended to 2013	1.2.3
4	1.1.1.3	Golden Perch	Open, extended to 2013	1.2.1 and 1.2.3
5	1.1.1.3	Goolwa Cockles/ Pipi	Open, extended to 2013	1.2.1 and 1.2.3
11	1.1.2.1	Golden Perch	Open, extended to 2012	1.2.3
15	1.1.2.2	Golden Perch	Open, major non-conformance	Now closed see below
17	1.1.2.2	Yellow-eye Mullet	Open, extended to 2013	1.2.3
24	2.1.3.1	All species	Open, major non-conformance	Now closed see below
25	2.1.5.1	All species	Open, major non-conformance	Now closed see below
26	2.2.2.1	All species	Open, extended to 2013	2.5.1, 2.5.3
27	2.2.2.2	All species	Open, as 24 and 25	Now closed see below
28	2.2.2.3	All species	Open, minor non-conformance	Now closed see below
29	3.4.1	All species	Open, as 24 and 25	Now closed see below
30	3.4.2	All species	Open, as 24 and 28	Now closed see below

Progress against major and minor non-conformances in December 2012

Condition/ non-conformances	Closed? (Y/N)	Justification
Condition 15. PI 1.1.2.2 Golden Perch major non-conformance	Y	The new stock assessment of Golden Perch was provided to SCS
Condition 24. PI 2.1.3.1 major non-conformance	Y	One independent SARDI observer per month is scheduled to be deployed on a vessel to provide verifiable evidence that the ETP logbook reporting process is effective and accurate
Condition 25. PI 2.1.5.1 major non-conformance	Y	Evidence was provided to SCS that logistical arrangements have been made to conduct a risk assessment workshop

		with an appropriate range of experts and stakeholders and that focused on assessing the risks of the fishery to listed species of birds that inhabit the Coorong, and particularly the Fairy Tern. The workshop was conducted and a report on the workshop findings issued by the end of April 2013.
Condition 28. PI 2.2.2.3 minor non-conformance	Y	Evidence of a finalized Induction Package for New Fishers that includes information about best practice was provided to SCS including evidence of adoption by existing entrants and any new entrants into the fishery.

4.3 Assessment Methodologies

All aspects of the assessment process were carried out under the auspices of SCS Global Services, an accredited MSC certification body, and in direct accordance with MSC requirements using the MSC Certification Requirements (CR v. 1.3, January 2013). For this report the MSC Full Assessment Reporting Template v. 1.3 was used.

In order to ensure a thorough and robust assessment process, and a process in which all interested stakeholders could and would participate, SCS provided opportunities for input at all stages of the assessment process, whether required or not by MSC procedures. The general steps followed were:

- Team Selection (January 2013)

At this first step of the assessment process, SCS sought input from interested parties. SCS sent out an advisory through direct email and posting on select web sites requesting comment on the nominations of persons capable of providing the expertise needed in the assessment. The team was confirmed with an announcement that was posted on the MSC website on the 29th January 2013
- Setting Performance Indicators and Scoring Guideposts (January-February 2013)

The SCS assessment team met by conference call and determined that the default criteria of the CR v1.3 was adequate for the assessment and posted notice of its use with indications of potential use of the RBF for some of the Performance Indicators to the MSC website (5th February 2013) to allow stakeholders to provide comments. No comments were received regarding the use of the default assessment tree.

- Input on fishery performance (February 2013)
 SCS requested that the applicants compile and submit written information to the assessment team illustrating the fishery's compliance with the required performance indicators (PI). At the same time, SCS requested that stakeholders submit their views on the fishery management system's functions and performance.
- Meetings with industry, managers, and stakeholders (20-22 March 2013)
 SCS planned for an onsite meeting including RBF and conducted meetings with industry, fishery managers, and fishery scientists in and around Adelaide, South Australia. Stakeholders were invited to meet with the assessment team and contribute to the RBF process. During the meeting new documents and reports were provided as part of the RBF work discussions and it was decided that the RBF was no longer required.
- Scoring fishery (March-November 2013)
 The assessment team met on the 22 March 2013 and attempted to determine on some preliminary scores using the required MSC methodology and the default assessment tree and without any direct input from the client group or stakeholders.
- Drafting report (April-December 2013)
 The assessment team in collaboration with the SCS lead assessor, Dr. Daume, drafted the report in accordance with MSC required process.
- Selection of peer reviewers (January-February 2014)
 SCS, as required, released an announcement (17 December 2013) of potential peer reviewers soliciting comment from stakeholders on the merit of the selected reviewers. No negative stakeholder comments were received and two peer reviewers were confirmed on the 20th January 2014. The peer review was conducted in March-April 2014.
- Release of Public Comment Draft Report (May 2014)
 SCS releases this draft report for public comment, soliciting stakeholder response through posting on MSC website and direct email to known potential stakeholders.
- Release of this Final Report with Certification Decision ()
- Release of the Public Certification Report ()

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits

The sites and people chosen for visits and interviews were based on the assessment team's need to acquire information about the management operations of the fisheries under evaluation and

conducting the RBF for some of the performance indicators. Agencies and their respective personnel responsible for fishery management, fisheries research, fisheries compliance, and habitat protection were identified and contacted with the assistance of the client group and stakeholders.

An Audit Plan was provided to the client, fisheries management and scientists before the meeting.

Meetings took place on the 20 - 22th March 2013 with Garry Hera-Singh and Neil MacDonald the representative for Fishery, as well as scientist and managers involved in the fishery (see Table 8).

Necessary documents were presented by the client to SCS prior and during the meetings. Follow up emails were sent to request additional information after the meeting.

Table 8: Assessment Meeting Attendees and Organizations

Name	Role	Affiliation
Sabine Daume	Lead Auditor	SCS
Sandy Morison	P1 Expert	Morison Aquatic Sciences
Trevor Ward	P2 Expert	Greenward Consulting
Mary Lack	P3 Expert	Shellack Pty Ltd
Garry Hera-Singh	Fishery Representative	Southern Fishermen's Association (SFA)
Neil MacDonald	Fishery Client	Southern Fishermen's Association (SFA)
Delan Dennis	Lakes & Coorong Fishery Owner/operator	Lakes & Coorong Fishery
Greg Ferguson	Research	SARDI
Qi Feng Yi	Research	SARDI
James Bennett	Management	PIRSA
Alice Fistr	Management	PIRSA
Gloria Jones	Manager, PA	Manager, PA
Henry Jones	Lakes & Coorong Fishery River Murray Advisory Board	Henry Jones Lakes & Coorong Fishery River Murray Advisory Board
Ian Fitzgerald	Recfish SA Secretary	Recfish SA
Jason Higham	Expert	DEWNR
Daniel Rogers	Expert	DEWNR
Stuart Hicks	Expert	DEWNR - NP&WS
Greg Kerr	Bird Specialist	
David Paton	Expert	Adelaide Uni
Bronwyn Gillanders	Expert	Adelaide Uni
Kathryn Warhurst	Stakeholder	Conservation Council of SA

4.4.2 Consultations

The SCS assessment team took the opportunity to consult with all stakeholders and experts listed in the attendance list above as part of the planned RBF meeting. The results of the specific risk assessment workshop on bird interactions in the Coorong are appended to the report (Appendix 7).

4.4.3 Evaluation Techniques

- a. **The rationale for choosing the media used for public announcements:** As part of the MSC requirements public announcements were posted on the MSC website. Announcements were also sent to a list of already established stakeholders. In addition announcements were posted in the newsletter of the Southern Fishermen's Association (SFA).
- b. **Methodology used:** The PCR report of the previous full assessment and the surveillance reports following the certification of the Fishery formed a baseline for this assessment. In addition a detailed submission was received by the client prior to the onsite meeting and further documents were requested from the client and received throughout the assessment process. One of the original team members (Dr. Trevor Ward), with an in depth knowledge about the fishery and the region, was also on this re-assessment team.
- b. **Scoring process and decision rule:** The Assessment Team member responsible for a particular Principle led the discussion on that Principle and drafted the scores and rationales to justify the score for that Principle. Other team members also ask questions or respond in turn during the onsite meeting and helped facilitate communication between the team and the client and scientists of the fishery. Draft scores and rationales were discussed during conference calls and over email during the report writing phase. In cases where consensus could not be reached the score were decided by the team leader and based on the recommendation of the respective Principle expert.

1. The report shall include (using Table 4.3 below):
- a. The set of scoring elements (e.g. species or habitats) that have been considered in each outcome PI in Principles 1 and 2.
- b. Under which component they were assessed.
- c. Whether any scoring elements are data-deficient.

(Reference: CR 27.10.7, Annex CB 3.1.1, Annex CC1.1.1.1)

Table 4.3 Scoring elements

Component	Scoring elements	Main/not main	Data-deficient or not
Principle 1 Outcome	Pipi (<i>Donax deltoides</i>)	N/A	Not
Principle 1 Outcome	Golden Perch (callop) (<i>Macquaria ambigua</i>),		Not
Principle 1 Outcome	Mulloway (<i>Argyrosomus hololepidotus</i>),		Not
Principle 1 Outcome	Yellow-eye Mullet (<i>Aldrichetta forsteri</i>).		Potentially but data was sufficient after onsite meeting
Principle 2 Retained Outcome	Black Bream (<i>Acanthopagrus butcheri</i>)	Not Main	Not
Principle 2 Retained Outcome	Greenback Flounder (<i>Rhombosolea tapirina</i>)	Not Main	Not
Principle 2 Retained Outcome	Bony Bream (<i>Nematalosa erebi</i>)	Main	Not

Principle 2 Bycatch Outcome	crabs	Not Main	Not
Principle 2 Bycatch Outcome	shrimps	Not Main	Not
Principle 2 Bycatch Outcome	rays	Not Main	Not
Principle 2 Bycatch Outcome	skates	Not Main	Not
Principle 2 Bycatch Outcome	sharks	Not Main	Not
Principle 2 Bycatch Outcome	finfish	Not Main	Not
Principle 2 ETP Outcome	Australian Pelican (<i>Pelecanus conspicillatus</i>)	Not Main	Not
Principle 2 ETP Outcome	Little Black Cormorant (<i>Phalacrocorax sulcirostris</i>)	Not Main	Not
Principle 2 ETP Outcome	Short-necked Turtle (<i>Emydura macquarii</i>)	Not Main	Not
Principle 2 ETP Outcome	Long-necked Turtle (<i>Chelodina longicollis</i>)	Not Main	Not
Principle 2 ETP Outcome	Murray Crayfish (<i>Euastacus armatus</i>)	Not Main	Not
Principle 2 ETP Outcome	Freshwater Catfish (<i>Tandanus tandanus</i>)	Not Main	Not
Principle 2 ETP Outcome	Silver Perch (<i>Bidyanus bidyanus</i>)	Not Main	Not
Principle 2 ETP Outcome	New Zealand Fur Seal (<i>Arctocephalus forsteri</i>)	Not Main	Not
Principle 2 ETP Outcome	Australian Sea Lion (<i>Neophoca cinerea</i>)	Not Main	Not
Principle 2 ETP Outcome	Great White Shark (<i>Carcharodon carcharias</i>)	Not Main	Not
Principle 2 ETP Outcome	Dolphins (<i>Tursiops</i> sp., <i>Delphinus</i> sp., <i>Lagenorhynchus</i> sp.)	Not Main	Not
Principle 2 ETP Outcome	Fairy Tern: <i>Sternula nereis nereis</i> , and Hooded Plover: <i>Thinornis rubricollis rubricollis</i>	Main	Potentially, but data was sufficient after onsite meeting that had a specific risk assessment workshop and results (Appendix 6)
Principle 2 Habitat Outcome	Gear types as deployed	N/A	Not
Principle 2 Ecosystem Outcome	Interaction of fishery with ecosystem structure and function criteria	N/A	Potentially but data was sufficient after onsite meeting

Risk based framework

As indicated in other sections, despite of initial discussion and announcements that was posted on the MSC website on February 5th 2013 to use the RBF for some of the Performance Indicators the RBF was not used for this assessment. During the onsite meeting the assessment team received additional documents and reports that indicated that the scoring and assessment could be conducted without using the RBF.

5 Traceability

5.1 Eligibility Date

The target eligibility date for the Lakes and Coorong Fishery, the date from which product from a certified fishery is eligible to bear the label if the fishery is certified, will be the 15th March 2014 which is the date the previous certificate expired.

(REQUIRED FOR PCR ONLY)

1. The report shall include:
 - a. The actual eligibility date.
 - b. The rationale for any difference in this date from the target eligibility date

5.2 Traceability within the Fishery

a. A description of the tracking, tracing and segregation systems within the fishery -

All licence holders in the Lakes and Coorong Fishery in South Australia (SA) as well as in any other fishery in SA, have to comply with specific regulations regarding the shipment of their product. These provisions are intended to enable compliance officers to trace product from the producer at point of landing until the product reaches the market.

These regulations are managed under the *Fisheries Management Act 2007* and subordinate regulations and include:

- The [Fisheries Management General Regulations 2007](#), which require any fish contained in a receptacle be marked with either
 - the name of the processor, or
 - the fishery licence holder, or
 - the fisher's licence number

- The [Fisheries Management \(Lakes and Coorong Fishery\) Regulations 2009](#), which also regulates the movement and sale of Pipis, requires that Pipis must only be consigned to a processor within the state of South Australia. All Pipis landed must be bagged and the bag sealed with a numbered tag and accompanied by a specific **catch disposal record (CDR)** form. This information is required to be provided as a prior report to the Fisheries Compliance group once fish have left the beach and are to be shipped to the processor. This system provides to control the catches taken against the legislated catch quota allocation for each licence.
- [Fisheries Management \(Fish Processors\) Regulations, 2007](#) also covers: the requirement to be registered, the keeping of records, and the provision of returns. All fish processors are obliged to maintain records of sales and purchases to enable a subsequent audit of the movement of product from producer to point of sale to the consumer.

b. An evaluation of possibility of vessels fishing outside the unit of certification –

The fishery is largely geographically isolated, and other than the Coorong coastal waters (out to 3 NM from the coast between Goolwa Beach Road and the Kingston Jetty), the fishery does not overlap or share waters with other fisheries.

At present there are no license holders with a vessel of suitable size or configuration that would enable net fishing operations outside of the Coorong waters. Therefore the possibility is very low and restricted to extremely rare occasions when an operator may have access to a different vessel.

There is an operator located in Kingston who has the opportunity to take Pipis off the Coorong beach by vehicle and land them at Kingston (on the southern boundary of the Fishery). The CDR prior reporting system is intended to ensure that any movement of Pipis off the beach are reported in order to allow Compliance checks on the product as it leaves the beach or reaches the designated unloading place.

Other than Kingston there is no landing port adjacent to the fishery where certified product could or would be landed. The majority of fish are taken within the Coorong or the Coorong beach and are then shipped across the Coorong to the mainland and transported by vehicle to either - Meningie, Goolwa, Clayton, Milang or Kingston.

c. An evaluation of the opportunity for substitution of certified fish with non-certified fish prior to and at the point of landing

There is little or no opportunity for species substitution in the Fishery. There are no commercial fishers operating in the Fishery that are not covered by the unit of certification.

There are also no commercial fishers operating in any other fishery (such as the Marine Scalefish Fishery) adjacent to the fishery that could provide substituted fish of the certified species. Although the assessment for certified species includes those shared stocks of species including Mulloway and Yellow-eye (Coorong) Mullet that inhabit both the Coorong and the marine waters off South Australia, other commercial fisheries for these species do not operate near the Coorong.

Access to inland points of landing is geographically limited by the waters of the Murray Mouth which are very difficult and at times unsafe to navigate. Therefore there is very limited opportunity of landings of fish inside the Coorong by vessels from coastal waters and the likelihood of substitution of certified fish non-certified fish is negligible from this source.

The certified species are also targeted by recreational fishers, but there is very limited opportunity for substitution of recreationally-caught fish with commercially caught fish. According to the most recent compliance risk assessment and plan it has never been identified as a risk (PIRSA, 2014).

d. A description of the “at-sea” processing of catch

There is no “at-sea” processing of catch in this Fishery. Producers do not have the capacity on small open boats to process and it is considered inappropriate and bad practice to even gill or gut fish until they are landed.

By law it is not permitted to fillet or transform fish at sea in order to ensure that it is possible to monitor and measure fish for compliance with the prescribed legal minimum lengths.

e. Details of transshipping in the Fishery

There is no transshipping in the Fishery.

f. Details on the number and/or location of points of landing

There are a limited number of points of landing in this Fishery. Any fish taken off the Coorong beach can only be landed from the beach at Kingston (southern end of the Fishery) or must be taken across the Coorong at one of only three (3) crossing points permitted within the Coorong National Park – 42 mile Crossing, Parnka and Barker’s Knoll.

Across the entire region of the fishery there are seven (7) locations at which product can be landed – Goolwa, Clayton, Milang, Narrung and Meningie on the lakes, Meningie and Kingston from the Coorong beach and Victor Harbor or Kingston in coastal marine waters.

Other than the above there are any number of small local launch and retrieval points on the Lakes and the Coorong, however any vehicle would have to pass through one of these towns in order to move their product.

The limited number of crossing points on the Coorong from the Coorong beach is seen as an effective basis for the monitoring of Papis under the quota management regime.

5.3 Eligibility to Enter Further Chains of Custody

a. Conclusion and determination of whether the product will be eligible to enter further certified chains of custody

All fish (finfish or pipi) landed by any of the license holders listed in Appendix 6 and processed on land by licensees or sold directly to distributors or restaurants locally, are eligible to seek and secure MSC chain of custody certification in order to sell product derived from the fishery with the MSC claim. Chain of custody starts at the first point of sale from the license holders unless there is some value added processing occurring in designated processing facilities in which case chain of custody starts at the point of landing.

b. A list of parties, or category of parties, eligible to use the fishery certification

All licence holders who hold a current Lakes & Coorong Fishery licence issued under the *Fisheries Management Lakes & Coorong Fishery Regulations 2009* are eligible to seek and secure MSC chain of custody certification in order to sell product derived from the fishery with the MSC claim.

c. A list of eligible points of landing

Goolwa
Clayton
Milang
Narrung
Meningie
Kingston
Victor Harbor

d. The point of change of ownership from which Chain of Custody (CoC) certification is required

The point for change of ownership under CoC should be the point at which the product is delivered to:

- A registered fish processor other than the licence holder;
- A carrier or transport agent for consignment to the purchaser or an interstate market);
- A business that purchases the product for the purposes of resale either as fresh or processed product (e.g. restaurant or wholesaler); or
- The point at which the licence holder or their agent sells the product direct to a consumer (such as at a farmer's market).

5.4 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody

There are no IPI stock(s) involved in the certification of this fishery.

6 Evaluation Results

6.1 Principle Level Scores

Table 6.1. Final Principle Scores

Final Principle Scores	
Principle	Score
Principle 1 – Target Species	Pipi: 91.3
	Mulloway: <80
	Golden Perch: <80
	Yellow-eye Mullet: <80
Principle 2 – Ecosystem	85
Principle 3 – Management System	89

6.2 Summary of Scores

Principle	Component	PI No.	Performance Indicator (PI)	Pipi	Mulloway	Golden Perch	Yellow-e Mullet
One	Outcome	1.1.1	Stock status	90	70	90	
		1.1.2	Reference points	90	80	80	
		1.1.3	Stock rebuilding				
	Management	1.2.1	Harvest strategy	90	90	90	
		1.2.2	Harvest control rules & tools	90	<60	<60	
		1.2.3	Information & monitoring	90	90	90	
		1.2.4	Assessment of stock status	85	85	80	
Two	Retained species	2.1.1	Outcome	85	85	85	
		2.1.2	Management	95	95	95	
		2.1.3	Information	80	80	80	
	Bycatch species	2.2.1	Outcome	80	80	80	
		2.2.2	Management	95	95	95	
		2.2.3	Information	75	75	75	
	ETP species	2.3.1	Outcome	90	90	90	
		2.3.2	Management	80	80	80	
		2.3.3	Information	80	80	80	
	Habitats	2.4.1	Outcome	90	90	90	
		2.4.2	Management	90	90	90	
		2.4.3	Information	90	90	90	
	Ecosystem	2.5.1	Outcome	85	85	85	
		2.5.2	Management	85	85	85	
		2.5.3	Information	75	75	75	
Three	Governance and policy	3.1.1	Legal & customary framework	95	95	95	
		3.1.2	Consultation, roles & responsibilities	6.2.1.1.1 85	6.2.1.1.2 85	6.2.1.1.3 85	6.2.1.1.4
		3.1.3	Long term objectives	100	100	100	
		3.1.4	Incentives for sustainable fishing	100	100	100	
	Fishery specific management system	3.2.1	Fishery specific objectives	100	100	100	
		3.2.2	Decision making processes	75	75	75	
		3.2.3	Compliance & enforcement	100	100	100	
		3.2.4	Research plan	70	70	70	
		3.2.5	Management performance evaluation	70	70	70	

6.3 Summary of Conditions

Table 6.3. Summary of Conditions

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/N/A)
1	By the second surveillance audit provide evidence that it is highly likely that the stock [Mulloway] is above the point where recruitment would be impaired.	1.1.1	
2-4	By the second surveillance audit implement the harvest control rule for Mulloway, Golden Perch and Yellow-eye Mullet respectively, that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.	1.2.2	
5	By the second surveillance audit provide evidence to the CAB that an ongoing fishery independent bycatch observation/ reporting program, to detect any increase in risk to main bycatch species has been implemented, of a design suitable for the scale of the fishery.	2.2.3	Y
6	By the first surveillance audit the client shall provide evidence to the CAB that a study on the main impacts of the fishery on key ecosystem elements has been developed with academic and industry collaborators. These should include an assessment of the ecological role of the truncated population structure in the trophic relationships of Black Bream and Greenback flounder in the Coorong. By the second surveillance audit evidence shall be provided to the CAB that funding has been secured and the work program has been commenced. By the third surveillance audit provide evidence that the work has been conducted. By the fourth surveillance audit a report shall be submitted to the CAB including an assessment of the findings.	2.5.3	
7	By the first surveillance audit the client shall demonstrate that processes are in place to ensure that explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	3.2.2	
8	By the second surveillance audit the client shall have developed a research plan that provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. The strategic approach adopted in	3.2.4	

	the research plan should be pro-active, anticipatory and capable of identifying gaps in knowledge in advance of management needs.		
	By the second surveillance audit the client shall ensure that the management system is subject to regular internal and occasional external review.	3.2.5	

Note: The table below is for summary purposes only. See Appendix 1.3 of this report template for full requirements for documenting Conditions in accordance with the MSC scheme requirements

6.4 Determination, Formal Conclusion and Agreement

(REQUIRED FOR FR AND PCR)

1. The report shall include a formal statement as to the certification determination recommendation reached by the Assessment Team about whether or not the fishery should be certified.

(Reference: CR 27.16)

(REQUIRED FOR PCR)

2. The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

6.5 Changes in the fishery prior to and since Pre-Assessment

(OPTIONAL)

Identify any work conducted by the client (or the management agency) specifically targeted at bringing the fishery to the MSC standard, either prior to or since any pre-assessment report that was prepared. This information is particularly valuable for MSC's reporting on the impacts of its programme.

7 References

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Appendix 1 Scoring and Rationales

Appendix 1.1 Performance Indicator Scores and Rationale

Evaluation Table for PI 1.1.1

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
A	Guidepost	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y <u>Yellow-eye Mullet</u> : Y	<u>Pipi</u> : Y <u>Mulloway</u> : N <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : N/S <u>Golden Perch</u> : Y Yellow-eye Mullet: Y

PI 1.1.1 The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing

Pipi:
 The catch and CPUE had declined in recent years and, prior to 2009/10, the previous performance indicators for the fishery (based on trends in fishery data) were not being met. Nevertheless, recent fishery-independent monitoring, which has demonstrated a substantial increase in the relative abundance of adults and in the proportion of sub-legal size animals, is strong evidence of the stock's continued capacity to provide recruitment. The minimum size limit is also close to the size at maturity and survival of discarded under-sized animals would be expected to be high. Therefore, there is a high degree of certainty that recruitment has not been impaired.

This meets the requirements for the SG 60, SG 80 and SG 100 levels.

Mulloway:
 The 2011 stock assessment concluded that that Mulloway in South Australia were vulnerable to over-exploitation because of the combination of critical juvenile habitat has been degraded by flow regulation and drought, establishment of a strong year class is dependent on strong freshwater inflows to the Murray River estuary and growth rates are low. This assessment also concluded that egg production of Mulloway may be compromised by the truncation of the age composition of the population that is likely the result of concurrent harvesting of juveniles in the estuary and adults in the nearshore marine environment, and of the high discard rates (with low post-release survival) of sub-legal sized juveniles. Recruitment strength has been linked to river flow and there has been no recent monitoring to assess the level of recruitment of Mulloway associated with the recent period of higher river flows. Indicators show fluctuations but no overall trends. The uncertainties expressed in the most recent stock assessment report (Ferguson and Ward, 2011) about the ability of the chosen fishery indicators to provide an accurate indication of stock status, and the lack of any monitoring of recruitment levels or age structure, mean that it is not **highly likely** that the stock is above the point where recruitment would be impaired.

This meets the requirements for SG 60 but not the SG 80 levels.

Golden Perch:
 Golden Perch is considered to be still abundant in the lower Murray River, the species is adapted to the variable flow regime of the system, and there is fishery-independent information that the stock in the lower lakes has exhibited strong recent recruitment after an unprecedented drought. The 2012 stock assessment and stock status report show that all the performance indicators are within their target ranges and that the population in the lower lakes now has a broader spread of age classes which, together, are indicative of a sustainable exploitation rate. These indicate that there is a high degree of certainty that the stock is above the point where recruitment would be impaired.

This meets the requirements of the SG 60, SG 80 and SG 100 levels.

Yellow-eye Mullet:
 The 2012 stock status report shows all performance indicators to be within their target ranges. The 2005 assessment considered the fishery to be sustainably exploited and performance indicators since then have remained within or above target levels. The species is relatively short-lived and reductions in levels of recruitment would be quickly apparent in catch and CPUE indicators. There is therefore a high degree of certainty that the stock is above the point where recruitment would be impaired.

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
b	Guidepost		The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.
	Met?		<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : N <u>Mulloway</u> : N/S <u>Golden Perch</u> : N Yellow-eye Mullet: Y

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
Justification		<p><u>Pipi:</u> The results of fishery-independent surveys indicates that the Pipi stock has recovered, was above the new target level in 2009/10 and fell to just below this target level in 2010/11. Data for 2011/12 are not currently available. Thus the stock is at or close to target levels but the short time series of data on relative abundance means that it cannot be said that there is a high degree of certainty that this is the case.</p> <p>This meets the requirements for the SG 80 level but not the SG 100 level.</p> <p><u>Mulloway:</u> The catch and CPUE performance indicators for the stock have returned to their target ranges for both the estuary and oceanic components of the fishery. They have been within the specified target ranges for the past 4 years except to a period of 2 years for one of the six indicators.</p> <p>This meets the requirements for the SG 80 level. (Compliance with SG 100 level not evaluated as other SG 80 scoring issues are not met)</p> <p><u>Golden Perch:</u> The catch and CPUE performance indicators for the stock are currently within their target ranges and have been for the last four years. Nevertheless, they are not currently above target levels and have not been fluctuating around target levels.</p> <p>This meets the requirements for the SG 80 level but not the SG 100 level.</p> <p><u>Yellow-eye Mullet:</u> The catch and CPUE performance indicators for the stock are currently within their target ranges and have been within or above them for the last four years. Furthermore, the sustained period of stable catches and relatively high CPUE levels provide a high degree of certainty that the stock has been close to or above target reference levels over recent years.</p> <p>This meets the requirements for the SG 80 and SG 100 levels.</p>	
		References	
Ferguson 2012b & 2013 – confidential report			
Stock Status relative to Reference Points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	<u>Pipi:</u> Fishery-independent index of abundance	<u>Pipi:</u> 10.5 kg/4.5 sq. m	<u>Pipi:</u> Above (13.2 kg/4.5 sq. m in 2011-12)
	<u>Mulloway:</u>	<u>Mulloway:</u>	<u>Mulloway:</u>

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
	<p>Fishery dependent catch and CPUE values and trends</p> <p><u>Golden Perch:</u> Fishery dependent catch and CPUE values and trends</p> <p><u>Yellow-eye Mullet:</u> Fishery dependent catch and CPUE values and trends</p>	<p>Target ranges specified for whole fishery and main sectors (see Table 4)</p> <p><u>Golden Perch:</u> Target ranges specified for whole fishery (see Table 5)</p> <p><u>Yellow-eye Mullet:</u> Target ranges specified for small mesh gill net fishery (see Table 6)</p>	<p>Within or above target ranges (see Table 4)</p> <p><u>Golden Perch:</u> Within target ranges (see Table 5)</p> <p><u>Yellow-eye Mullet:</u> Within target ranges (see Table 6)</p>
Limit reference point	<p><u>Pipi</u> Fishery-independent index of abundance</p> <p><u>Mulloway:</u> Fishery dependent catch and CPUE values and trends</p> <p><u>Golden Perch:</u> Fishery dependent catch and CPUE values and trends</p> <p><u>Yellow-eye Mullet:</u> Fishery dependent catch and CPUE values and trends</p>	<p><u>Pipi:</u> 4 kg/ 4.5 sq. m</p> <p><u>Mulloway:</u> Lower limits specified for whole fishery and main sectors (see Table 4)</p> <p><u>Golden Perch:</u> Lower limits specified for whole fishery (see Table 5)</p> <p><u>Yellow-eye Mullet:</u> Lower limits specified for small mesh gill net fishery (see Table 6)</p>	<p><u>Pipi:</u> Above target levels</p> <p><u>Mulloway:</u> Above limits (see Table 4)</p> <p><u>Golden Perch:</u> Above limits (see Table 5)</p> <p><u>Yellow-eye Mullet:</u> Above limits (see Table 6)</p>
OVERALL PERFORMANCE INDICATOR SCORE:			<p><u>Pipi:</u> 90</p> <p><u>Mulloway:</u> 70</p> <p><u>Golden Perch:</u> 90</p> <p><u>Yellow-eye Mullet:</u> 100</p>
CONDITION NUMBER (if relevant):			
<p><u>Condition 1 Mulloway:</u></p> <p>By the second surveillance audit provide evidence that it is highly likely that the stock is above the point where recruitment would be impaired.</p>			

Evaluation Table for PI 1.1.2

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y <u>Yellow-eye Mullet</u> : Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y <u>Yellow-eye Mullet</u> : Y	
	Justification	<p><u>Pipi</u>: New reference points for the pipi fishery have been agreed and applied even though they are yet to be formally recognised in a revised management plan. These limit and target reference points are based on the results of fishery-independent assessments of stock levels. They are appropriate for the stock and can be estimated.</p> <p>This meets the requirements for the SG 60 and SG 80 levels.</p> <p><u>Mulloway</u>: The reference points that have been adopted for Mulloway are generic but are justifiable and reasonable based on the scale and intensity of the fishery and can be estimated.</p> <p>This meets the requirements for the SG 60 and SG 80 levels.</p> <p><u>Golden Perch</u>: The reference points that have been adopted for Golden Perch are generic but are justifiable and reasonable based on the scale and intensity of the fishery and can be estimated.</p> <p>This meets the requirements for the SG 60 and SG 80 levels.</p> <p><u>Yellow-eye Mullet</u>: The reference points that have been adopted for Golden Perch are generic but are justifiable and reasonable based on the scale and intensity of the fishery and can be estimated.</p> <p>This meets the requirements for the SG 60 and SG 80 levels.</p>		

PI 1.1.2		Limit and target reference points are appropriate for the stock		
b	Guidepost		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N

PI 1.1.2	Limit and target reference points are appropriate for the stock
Justification	<p><u>Pipi:</u> The limit reference point in the new harvest strategy is set above the level at which there is appreciable risk of impairing reproductive capacity. The strong recent recruitment and the knowledge of the natural fluctuations in abundance that are common with this species are evidence that reproductive capacity would remain strong at the biomass levels implied by the LRP. The LRP therefore takes account of precautionary issues such as the lack of an estimate of the abundance of pre-recruits and the resulting uncertainty over the level of recruitment.</p> <p>This meets the requirements of the SG 80 and SG 100 levels.</p> <p><u>Mulloway:</u> The limit reference points chosen for Mulloway are set at levels that, collectively, should ensure that there is not an appreciable risk of impairing reproductive capacity. They are based on lower ranges over a reference period. Although this is appropriate for the scale of the fishery this approach does not take account of precautionary issues such as being entirely reliant on fishery-dependent data.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p> <p><u>Golden Perch:</u> The limit reference points chosen for Golden Perch are set at levels that, collectively, should ensure that there is not an appreciable risk of impairing reproductive capacity. They are based on lower ranges over a reference period. Although this is appropriate for the scale of the fishery this approach does not take account of precautionary issues such as being entirely reliant on fishery-dependent data.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p> <p><u>Yellow-eye Mullet:</u> The limit reference points chosen for Yellow-eye Mullet are set at levels that, collectively, should ensure that there is not an appreciable risk of impairing reproductive capacity. They are based on lower ranges over a reference period. Although this is appropriate for scale of the fishery this approach does not take account of precautionary issues such as being entirely reliant on fishery-dependent data.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p>

PI 1.1.2		Limit and target reference points are appropriate for the stock		
c	Guidepost		The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.
	Met?		<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : N <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N

PI 1.1.2		Limit and target reference points are appropriate for the stock	
	Justification	<p><u>Pipi:</u> The new target reference point should ensure that the stock is maintained at a level that, although not specifically referencing B_{MSY}, is consistent with such an approach and has a similar intent. It takes into account precautionary issues, such as the absence of a time series of stock sizes and recruitment levels, by being set at a relatively high level.</p> <p>This meets the requirements of the SG 80 and SG 100 levels.</p> <p><u>Mulloway:</u> The target reference points chosen for mulloway are set at levels that, collectively, should ensure that the stock is maintained at a level that, although not specifically referencing B_{MSY}, is consistent with such an approach and has a similar intent. They are based on upper ranges over a reference period. They do not, however, take account of precautionary issues such as being entirely reliant on fishery-dependent data.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p> <p><u>Golden Perch:</u> The target reference points chosen for Golden Perch are set at levels that, collectively, should ensure that the stock is maintained at a level that, although not specifically referencing B_{MSY}, is consistent with such an approach and has a similar intent. They are based on upper ranges over a reference period. They do not, however, take account of precautionary issues such as being entirely reliant on fishery-dependent data.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p> <p><u>Yellow-eye Mullet:</u> The target reference points chosen for Yellow-eye Mullet are set at levels that, collectively, should ensure that the stock is maintained at a level that, although not specifically referencing B_{MSY}, is consistent with such an approach and has a similar intent. They do not, however, take account of precautionary issues such as being entirely reliant on fishery-dependent data.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p>	
d		Guidepost	
	Met?		<u>Pipi:</u> Not relevant <u>Mulloway:</u> Not

PI 1.1.2		Limit and target reference points are appropriate for the stock	
			relevant <u>Golden Perch</u> : Not relevant relevant <u>Yellow-eye Mullet</u> : Not relevant
	Justification	<p><u>Pipi</u>: Pipis meet none of the criteria for a LTL species.</p> <p><u>Mulloway</u>: Mulloway are an apex predator and meet none of the criteria for a LTL species.</p> <p><u>Golden Perch</u>: Golden Perch are an apex predator and meet none of the criteria for a LTL species.</p> <p><u>Yellow-eye Mullet</u>: Yellow-eye Mullet meet none of the criteria for a LTL species. <i>(Reference: CR Annex CB2.3.13- CB2.3.21)]</i></p>	
References		Ferguson, (2012b & 2013 – confidential report); PIRSA, 2012a	
OVERALL PERFORMANCE INDICATOR SCORE:			<u>Pipi</u> : 90 <u>Mulloway</u> : 80 <u>Golden Perch</u> : 80 <u>Yellow-eye Mullet</u> : 80
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 1.1.3

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place.		Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.
	Met?	<u>Pipi</u> : N/A <u>Mulloway</u> : N/A <u>Golden Perch</u> : N/A <u>Yellow-eye Mullet</u> : N/A		<u>Pipi</u> : N/A <u>Mulloway</u> : N/A <u>Golden Perch</u> : N/A <u>Yellow-eye Mullet</u> : N/A
	Justification	<p><u>Pipi</u>: Stocks of pipi were considered to have become depleted by 2007/08 although the extent of this depletion could not be estimated. Nevertheless, the measures implemented (reductions in the TACC) led to a rebuilding of the stock within three years. This PI is therefore no longer relevant for Pipi and is not scored.</p> <p><u>Mulloway</u>: Mulloway stocks are not considered to be depleted and in need of rebuilding.</p> <p><u>Golden Perch</u>: Golden Perch stocks within the area of the LCF were considered to have been depleted in 2000. They are now considered to have rebuilt and further rebuilding is not considered necessary.</p> <p><u>Yellow-eye Mullet</u>: Yellow-eye Mullet stocks are not considered to be depleted and in need of rebuilding</p>		

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
b	Guidepost	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
	Met?	<u>Pipi</u> : N/A <u>Mulloway</u> : N/A <u>Golden Perch</u> : N/A <u>Yellow-eye Mullet</u> : N/A	<u>Pipi</u> : N/A <u>Mulloway</u> : N/A <u>Golden Perch</u> : N/A <u>Yellow-eye Mullet</u> : N/A	<u>Pipi</u> : N/A <u>Mulloway</u> : N/A <u>Golden Perch</u> : N/A <u>Yellow-eye Mullet</u> : N/A
	Justification	<u>Pipi</u> : Not applicable <u>Mulloway</u> : Not applicable <u>Golden Perch</u> : Not applicable <u>Yellow-eye Mullet</u> : Not applicable		

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
c	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within a specified timeframe.	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	
	Met?	<u>Pipi</u> : N/A <u>Mulloway</u> : N/A <u>Golden Perch</u> : N/A <u>Yellow-eye Mullet</u> : N/A	<u>Pipi</u> : N/A <u>Mulloway</u> : N/A <u>Golden Perch</u> : N/A <u>Yellow-eye Mullet</u> : N/A	
	Justification	<u>Pipi</u> : Not applicable <u>Mulloway</u> : Not applicable <u>Golden Perch</u> : Not applicable <u>Yellow-eye Mullet</u> : Not applicable		
References		Ferguson, (2012b & 2013 – confidential report); PIRSA, 2012a		
OVERALL PERFORMANCE INDICATOR SCORE:				<u>Pipi</u> : N/A <u>Mulloway</u> : N/A <u>Golden Perch</u> : N/A <u>Yellow-eye Mullet</u> : N/A
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.1

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y

PI 1.2.1	There is a robust and precautionary harvest strategy in place
Justification	<p><u>Pipi:</u> The new harvest strategy will be responsive to the state of the stock, is designed to achieve the objectives, and its elements, including the monitoring program and the harvest control rules work together to achieve management objectives reflected in the reference points.</p> <p>This meets the requirements of the SG 60, SG 80 and SG 100 levels.</p> <p><u>Mulloway:</u> The performance indicators selected for mulloway should be responsive to the state of the stock as both catch and CPUE would be expected to rise or fall with the size of the stock.</p> <p>The harvest strategy is designed to achieve the stock management objectives that are reflected in the target and limit reference points. The selected reference points that define the acceptable range of each indicator are, however, very widely spaced. This has been a deliberate strategy that attempts to reflect the highly dynamic nature of the Lakes and Coorong Fishery, the inherent uncertainty in assessment processes and the range of external factors that can influence assessment outcomes.</p> <p>The management actions that may arise following breaches of reference points, although non-prescriptive, are expected to achieve stock management objectives that are reflected in the target and limit reference points.</p> <p>This meets the requirements of the SG 60, SG 80 and SG 100 levels.</p> <p><u>Golden Perch:</u> The performance indicators selected for Golden Perch should be responsive to the state of the stock as both catch and CPUE would be expected to rise or fall with the size of the stock.</p> <p>The harvest strategy is designed to achieve the stock management objectives that are reflected in the target and limit reference points. The selected reference points that define the acceptable range of each indicator are, however, very widely spaced. This has been a deliberate strategy that attempts to reflect the highly dynamic nature of the Lakes and Coorong Fishery, the inherent uncertainty in assessment processes and the range of external factors that can influence assessment outcomes.</p> <p>The management actions that may arise following breaches of reference points, although non-prescriptive, are expected to achieve stock management objectives that are reflected in the target and limit reference points.</p> <p>This meets the requirements of the SG 60, SG 80 and SG 100 levels.</p> <p><u>Yellow-eye Mullet:</u> The performance indicators selected for Yellow-eye Mullet should be responsive to the state of the stock as both catch and CPUE would be expected to rise or fall with the size of the stock.</p> <p>The harvest strategy is designed to achieve the stock management objectives that are reflected in the target and limit reference points. The selected reference points that define the acceptable range of each indicator are, however, very widely spaced. This has been a deliberate strategy that attempts to reflect the</p>

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
b	Guidepost	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : N <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N

PI 1.2.1	There is a robust and precautionary harvest strategy in place
Justification	<p><u>Pipi:</u> The new harvest strategy is likely to work based on its demonstrated ability to reduce fishing pressure, on the evidence of rapid stock rebuilding, and on the known biology of the species. It has not been fully tested but monitoring is in place which has provided evidence that it is achieving its objectives.</p> <p>This meets the requirements of the SG 60 and SG 80 but not the SG 100 levels.</p> <p><u>Mulloway:</u> The harvest strategy for mulloway is likely to work based on experience with its implementation since 2005 and especially through the unprecedented period of low flows which produced particularly adverse estuarine conditions.</p> <p>The harvest strategy has not been tested but the indicators are monitored and reported annually. There is evidence that the harvest strategy is achieving its objectives in the form of the relatively stable CPUE from both sectors and the recovery in total catches after two years below the lower reference point.</p> <p>This meets the requirements of the SG 60 and SG 80 but not the SG 100 levels.</p> <p><u>Golden Perch:</u> The harvest strategy for Golden Perch is likely to work based on experience with its implementation since 2005 and the rebuilding of the population that has occurred after the unprecedented period of low flows through the lower lakes.</p> <p>The harvest strategy has not been tested but the indicators are monitored and reported annually. There is evidence that the harvest strategy is achieving its objectives in the form of the maintenance of a viable fishery through an unprecedented drought and the indicators of a subsequent increase in recruitment.</p> <p>This meets the requirements of the SG 60 and SG 80 but not the SG 100 levels.</p> <p><u>Yellow-eye Mullet:</u> The harvest strategy for Yellow-eye Mullet is likely to work based on experience with its implementation since 2005 and the stability of the fishery through the unprecedented period of low flows which produced particularly adverse estuarine conditions.</p> <p>The harvest strategy has not been tested but the indicators are monitored and reported annually. There is evidence that the harvest strategy is achieving its objectives from the stability of the key fishery indicators through the unprecedented period of low flows which produced particularly adverse estuarine conditions.</p> <p>This meets the requirements of the SG 60 and SG 80 but not the SG 100 levels.</p>

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
c	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y <u>Yellow-eye Mullet</u> : Y		

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
	Justification	<p><u>Pipi:</u> An annual fishery-independent monitoring program has commenced that is expected to track the relative abundance and size structure of the target stock. Monitoring of the fishery also occurs through targeted research programs and through mandatory logbooks with record catch and effort data. These are supplemented by less regular stock assessments that more fully consider these catch and effort data and also incorporate findings from targeted research programs. Collectively, these monitor the fishery in sufficient detail to determine whether the harvest strategy is working.</p> <p>This meets the requirements for the SG 60 level.</p> <p><u>Mulloway:</u> Monitoring of the fishery occurs through annual status reports that use data from mandatory logbooks which record catch and effort. These are supplemented by less regular stock assessments that more fully consider these catch and effort data and also incorporate findings from targeted research programs. Collectively, these monitor the fishery in sufficient detail to determine whether the harvest strategy is working.</p> <p>This meets the requirements for the SG 60 level.</p> <p><u>Golden Perch:</u> Monitoring of the fishery occurs through annual status reports that use data from mandatory logbooks which record catch and effort. These are supplemented by less regular stock assessments that more fully consider these catch and effort data and also incorporate findings from targeted research programs. Collectively, these monitor the fishery in sufficient detail to determine whether the harvest strategy is working.</p> <p>This meets the requirements for the SG 60 level.</p> <p><u>Yellow-eye Mullet:</u> Monitoring of the fishery occurs through annual status reports that use data from mandatory logbooks which record catch and effort. These are supplemented by less regular stock assessments that more fully consider these catch and effort data and also incorporate findings from targeted research programs. Collectively, these monitor the fishery in sufficient detail to determine whether the harvest strategy is working.</p> <p>This meets the requirements for the SG 60 level.</p>	
d	Guidepost		The harvest strategy is periodically reviewed and improved as necessary.
	Met?		<u>Pipi:</u> Y <u>Mulloway:</u> Y <u>Golden Perch:</u> Y

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
				Yellow-eye Mullet: Y
	Justification	<p><u>Pipi:</u> The harvest strategy is periodically reviewed as indicated by the complete change that was recently made in response to concerns about stock status and the need to revise management arrangements.</p> <p>This meets the requirements of the SG 100 level.</p> <p><u>Mulloway:</u> The harvest strategy for mulloway has not been altered since it was introduced. Nevertheless, the intention to review the performance indicators as knowledge improves is clearly articulated in the management plan and it is expected that amendments would be made if shown to be necessary. A willingness to alter such indicators is demonstrated in the changes made to those for pipi.</p> <p>This meets the requirements of the SG 100 level.</p> <p><u>Golden Perch:</u> The harvest strategy for Golden Perch has not been altered since it was introduced. Nevertheless, the intention to review the performance indicators as knowledge improves is clearly articulated in the management plan and it is expected that amendments would be made if shown to be necessary. A willingness to alter such indicators is demonstrated in the changes made to those for pipi.</p> <p>This meets the requirements of the SG 100 level.</p> <p><u>Yellow-eye Mullet:</u> The harvest strategy for Yellow-eye Mullet has not been altered since it was introduced. Nevertheless, the intention to review the performance indicators as knowledge improves is clearly articulated in the management plan and it is expected that amendments would be made if shown to be necessary. A willingness to alter such indicators is demonstrated in the changes made to those for pipi.</p> <p>This meets the requirements of the SG 100 level.</p>		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant for all species	Not relevant for all species	Not relevant for all species

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
	Justification	Sharks are not a target species.	
References		Ferguson (2012b & 2013 – confidential report); PIRSA, 2012a; Sloan, 2005	
OVERALL PERFORMANCE INDICATOR SCORE:			
		<u>Pipi:</u>	90
		<u>Mulloway:</u>	90
		<u>Golden Perch:</u>	90
		<u>Yellow-eye Mullet:</u>	90
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 1.2.2

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N	<u>Pipi</u> : Y <u>Mulloway</u> : N/S <u>Golden Perch</u> : N/S Yellow-eye Mullet: N/S	

PI 1.2.2	There are well defined and effective harvest control rules in place
Justification	<p><u>Pipi:</u> There are generally understood harvest rules that have been used in the TACC setting process. The proposed harvest control rules for pipi are clearly articulated in the harvest strategy, consistent with it, and would act to reduce the exploitation rate as the limit reference point was approached.</p> <p>This is consistent with the requirements for the SG 60 and SG 80 levels.</p> <p><u>Mulloway:</u> The existing harvest rules for mulloway are generally understood and the possible ways that they <u>might</u> be amended to reduce the exploitation rate if limit reference points are <u>breached</u> are clearly outlined in the management plan. There is also evidence that management measures would be taken under such a scenario from the experience with Pipi where there was a major response to the breaching of its limit reference points. When the catch limit reference point for mulloway was breached in 2009-10 and 2010-11, however, there was no remedial action because a new assessment and revisions to the management arrangements were planned.</p> <p>Nevertheless, the form of the harvest control rule does not act to keep the stock above the limit reference point, it does not reduce the exploitation rate as a limit reference point is approached, nor does it act to return the stock to target levels when below it.</p> <p>This does not meet the requirements of the SG 60 level.</p> <p><u>Golden Perch:</u> The existing harvest rules for Golden Perch are generally understood and the possible ways that they <u>might</u> be amended to reduce the exploitation rate if limit reference points are <u>breached</u> are clearly outlined in the management plan. There is also evidence that management measures would be taken under such a scenario from the experience with pipi where there was a major response to the breaching of its limit reference points. Nevertheless, they do not act to reduce exploitation rates as limit reference points are <u>approached</u>. The form of the harvest control rule does not act to keep the stock above the limit reference point nor does it act to return the stock to target levels when they are below it.</p> <p>This does not meet the requirements of the SG 60 level.</p> <p><u>Yellow-eye Mullet:</u> The existing harvest rules for Yellow-eye Mullet are generally understood and the possible ways that they <u>might</u> be amended to reduce the exploitation rate if limit reference points are <u>breached</u> are clearly outlined in the management plan. There is also evidence that management measures would be taken under such a scenario from the experience with pipi where there was a major response to the breaching of its limit reference points. Nevertheless, they do not act to reduce exploitation rates as limit reference points are <u>approached</u>. The form of the harvest control rule does not act to keep the stock above the limit reference point nor does it act to return the stock to target levels when they are below it.</p> <p>This does not meet the requirements of the SG 60 level.</p>
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PI 1.2.2		There are well defined and effective harvest control rules in place		
b	Guidepost		The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules takes into account a wide range of uncertainties.
	Met?		<u>Pipi</u> : Y <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N	<u>Pipi</u> : N <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N
	Justification	<p><u>Pipi</u>: The proposed harvest control rules for Pipi would explicitly take into account the main uncertainties which arise from the potential for recruitment to vary substantially from year to year and for abundance to change rapidly even within a fishing season. This is a designed part of the harvest strategy but there is not an explicit consideration of a wide range of uncertainties.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p> <p><u>Mulloway</u>: The potential harvest control rules for mulloway have been deliberately left broad to reflect the inherently dynamic nature of a stock that has a dependency on an estuarine system with a naturally highly variable flow regime. The unpredictability of the system and hence of the level of future recruitment constitute one of the main uncertainties for mulloway. The harvest control rules, however, do not explicitly take this uncertainty into account.</p> <p>This does not meet the requirements of the SG 80 level.</p> <p><u>Golden Perch</u>: The potential harvest control rules for Golden Perch have been deliberately left broad to reflect the inherently dynamic nature of a stock whose abundance is thought to be related to a naturally highly variable flow regime. The unpredictability of the system and hence of the level of future recruitment constitute one of the main uncertainties for Golden Perch. The harvest control rules, however, do not explicitly take this uncertainty into account.</p> <p>This does not meet the requirements of the SG 80 level.</p> <p><u>Yellow-eye Mullet</u>: The potential harvest control rules for Yellow-eye Mullet have been deliberately left broad to reflect the inherently dynamic nature of a stock whose abundance is thought to be related to a naturally highly variable flow regime. The unpredictability of the system and hence of the level of future recruitment constitute one of the main uncertainties for Golden Perch. The harvest control rules, however, do not explicitly take this uncertainty into account.</p> <p>This does not meet the requirements of the SG 80 level.</p>		

PI 1.2.2		There are well defined and effective harvest control rules in place		
c	Guidepost	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N

PI 1.2.2	There are well defined and effective harvest control rules in place									
	Justification	<p><u>Pipi:</u> Available evidence, in the form of the rebuilding shown by the fishery-independent monitoring and the low non-compliance risks reported for the fishery indicates that the tools used for the pipi fishery are appropriate and effective in achieving the exploitation levels required under the harvest control rules.</p> <p>This meets the requirements for the SG 60, SG 80 and SG 100 levels.</p> <p><u>Mulloway:</u> The available evidence, in the form of the relatively stable CPUE from both sectors, the recovery in total catches after two years below the lower reference point, the low non-compliance rates reported for the fishery and in the fact that the fishery mostly meets all of the established performance indicators indicates that the tools in use are appropriate and effective in achieving the required exploitation levels.</p> <p>This meets the requirements for the SG 60 and SG 80 levels.</p> <p><u>Golden Perch:</u> The available evidence, in the form of the low non-compliance rates reported for the fishery and in the fact that the Golden Perch fishery mostly meets all of the established performance indicators indicates that the tools used to implement the harvest control rules are appropriate and effective in controlling exploitation.</p> <p>This meets the requirements for the SG 60 and SG 80 levels.</p> <p><u>Yellow-eye Mullet:</u> The available evidence, in the form of both the low non-compliance rates reported for the fishery and in the fact that the fishery for Yellow-eye Mullet has met all of the established performance indicators, indicates that the tools used to implement the harvest control rules are appropriate and effective in controlling exploitation.</p> <p>This meets the requirements for the SG 60 and SG 80 levels.</p>								
References	Ferguson (2012b & 2013 – confidential report); PIRSA, 2012a; Sloan, 2005									
OVERALL PERFORMANCE INDICATOR SCORE:		<table style="width: 100%; border: none;"> <tr> <td style="text-align: right;"><u>Pipi:</u></td> <td style="text-align: right;">90</td> </tr> <tr> <td style="text-align: right;"><u>Mulloway:</u></td> <td style="text-align: right;"><60</td> </tr> <tr> <td style="text-align: right;"><u>Golden Perch:</u></td> <td style="text-align: right;"><60</td> </tr> <tr> <td style="text-align: right;"><u>Yellow-eye Mullet:</u></td> <td style="text-align: right;"><60</td> </tr> </table>	<u>Pipi:</u>	90	<u>Mulloway:</u>	<60	<u>Golden Perch:</u>	<60	<u>Yellow-eye Mullet:</u>	<60
<u>Pipi:</u>	90									
<u>Mulloway:</u>	<60									
<u>Golden Perch:</u>	<60									
<u>Yellow-eye Mullet:</u>	<60									
CONDITION NUMBER (if relevant):										
<p><u>Pre-Condition 2a Mulloway:</u></p> <p>By May 2014 submit a revised harvest control rule for mulloway to the Fisheries Council that would keep the stock above the limit reference point, reduce the exploitation rate as</p>										

PI 1.2.2	There are well defined and effective harvest control rules in place
	<p>the limit reference point is approached, and return the stock to target levels when below it.</p> <p><u>Condition 2b Mulloway:</u></p> <p>By the second surveillance audit implement the harvest control rule for mulloway that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.</p> <p><u>Pre-Condition 3a Golden Perch:</u></p> <p>By May 2014 submit a revised harvest control rule for Golden Perch to the Fisheries Council that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.</p> <p><u>Condition 3b Golden Perch:</u></p> <p>By the second surveillance audit implement the harvest control rule for Golden Perch that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.</p> <p><u>Pre-Condition 4a Yellow-eye Mullet:</u></p> <p>By May 2014 submit a revised harvest control rule for Yellow-eye Mullet to the Fisheries Council that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.</p> <p><u>Condition 4b Yellow-eye Mullet:</u></p> <p>By the second surveillance audit implement the harvest control rule for Yellow-eye Mullet that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.</p>

Evaluation Table for PI 1.2.3

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: N

PI 1.2.3	Relevant information is collected to support the harvest strategy
Justification	<p><u>Pipi:</u> Data obtained from the fishery-independent surveys and from monitoring of the fishery provide information that is sufficient to support the harvest strategy. Information on stock structure is limited but assumptions are conservative.</p> <p>The range of information available is diverse and quite comprehensive considering the nature and scale of the fishery. It is supported by a substantial amount of research on the ecology of the Lakes and Coorong ecosystem which, although not undertaken for fishery management purposes, has provided improved understanding of the system and its responses to variation in flow regimes.</p> <p>This meets the requirements for the SG 60, SG 80 and SG 100 levels.</p> <p><u>Mulloway:</u> Studies on stock structure, age composition and growth as well as monitoring of the fishery provide information sufficient to support the harvest strategy.</p> <p>The range of information available on mulloway is diverse and quite comprehensive considering the nature and scale of the fishery. It is supported by a substantial amount of research on the ecology of the Lakes and Coorong ecosystem which, although not undertaken for fishery management purposes, has provided improved understanding of the system and its responses to variation in flow regimes.</p> <p>This meets the requirements for the SG 60, SG 80 and SG 100 levels.</p> <p><u>Golden Perch:</u> Studies on stock structure, age composition and growth as well as monitoring of the fishery provide information sufficient to support the harvest strategy.</p> <p>The range of information available on Golden Perch is diverse and quite comprehensive considering the nature and scale of the fishery. It is supported by a substantial amount of research on the ecology of the Lakes and Coorong ecosystem which, although not undertaken for fishery management purposes, has provided improved understanding of the system and its responses to variation in flow regimes.</p> <p>This meets the requirements for the SG 60, SG 80 and SG 100 levels.</p> <p><u>Yellow-eye Mullet:</u> Although not from the area of the fishery, there is information available on stock structure, age composition and growth which, together with the monitoring of the fishery, provide information sufficient to support the harvest strategy.</p> <p>The range of information available on Yellow-eye Mullet is diverse considering the nature and scale of the fishery. Nevertheless, much is from other areas of the species range and its applicability to the stock fished by the LCF has not been demonstrated.</p> <p>This meets the requirements for the SG 60 and SG 80 levels but not the SG 100 level.</p>
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PI 1.2.3		Relevant information is collected to support the harvest strategy		
b	Guidepost	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met ?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : N <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N

PI 1.2.3	Relevant information is collected to support the harvest strategy
Justification	<p><u>Pipi:</u> Fishery removals are monitored by the mandatory monthly returns. Stock abundance and size composition are monitored three times a year by the well-designed fishery-independent surveys that cover the area of the fishery and are conducted three times a year. These provide information on several indicators which support the harvest control rule. All information required by the harvest control rule is monitored with high frequency and a high degree of certainty. Nevertheless, and particularly at this early stage in the implementation of the harvest strategy, there is not yet a good understanding of the inherent uncertainties in the information or the robustness of the assessment and management to these uncertainties. This meets the requirements of the SG 60 and SG 80 levels but not the SG 100 level.</p> <p><u>Mulloway:</u> Fishery removals and effort are monitored by the mandatory monthly returns. Stock abundance is reported annually through fishery-dependent CPUE that is calculated for both the estuary fishery and the marine fishery. These provide information on several indicators at a level of accuracy and coverage which are consistent with, and provide support for, the harvest control rule. All information required by the harvest control rule for Mulloway is monitored with high frequency and a high degree of certainty. Nevertheless, the harvest strategy is currently based on fishery-dependent data and, although there is a general understanding of the inherent uncertainties in this information, this understanding could not be said to be good and it is not clear that the assessment and management are robust to these uncertainties. This meets the requirements of the SG 60 and SG 80 levels but not the SG 100 level.</p> <p><u>Golden Perch:</u> Fishery removals and effort are monitored by the mandatory monthly returns. Stock abundance is reported annually through fishery-dependent CPUE that is calculated for the targeted fishery. These provide information on several indicators at a level of accuracy and coverage which are consistent with, and provide support for, the harvest control rule. All information required by the harvest control rule for Golden Perch is monitored with high frequency and a high degree of certainty. Nevertheless, the harvest strategy is currently based on fishery-dependent data and, although there is a general understanding of the inherent uncertainties in this information, this understanding could not be said to be good and it is not clear that the assessment and management are robust to these uncertainties. This meets the requirements of the SG 60 and SG 80 levels but not the SG 100 level.</p> <p><u>Yellow-eye Mullet:</u> Fishery removals and effort are monitored by the mandatory monthly returns. Stock abundance is reported annually through fishery-dependent CPUE that is calculated for the targeted fishery and other sectors. These provide information on several indicators at a level of accuracy and coverage which are consistent with, and provide support for, the harvest control rule. All information required by the harvest control rule for Yellow-eye Mullet is monitored with high frequency and a high degree of certainty. Nevertheless, the harvest strategy is currently based on fishery-dependent data and, although there is a general understanding of the inherent uncertainties in this information, this understanding could not be said to be good and it is not clear that the assessment</p>

PI 1.2.3		Relevant information is collected to support the harvest strategy	
c	Guidepost		There is good information on all other fishery removals from the stock.
	Met?		<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y <u>Yellow-eye Mullet</u> : Y
	Justification	<p><u>Pipi</u>: Other fishery removals from the pipi stock occur from recreational fishes. Their take has been estimated by periodic surveys of recreational fishing and found to be less than 1 per cent of the commercial take. This meets the requirements of the SG 80 level.</p> <p><u>Mulloway</u>: Other fishery removals from the mulloway stock occur from recreational fishers. Their take has been estimated by periodic surveys of recreational fishing and found to be of a similar magnitude to the commercial take. This meets the requirements of the SG 80 level.</p> <p><u>Golden Perch</u>: Other fishery removals from the Golden Perch stock occur from recreational fishers. Their take has been estimated by periodic surveys of recreational fishing and in the lower lakes found to be substantially less than the commercial take and may come mainly from a different stock. This meets the requirements of the SG 80 level.</p> <p><u>Yellow-eye Mullet</u>: Other fishery removals from the Yellow-eye Mullet stock occur from the Marine Scalefish Fishery and the recreational fishery. The Marine Scalefish Fishery is monitored in the same way as the LCF. The recreational fishery take has been estimated by periodic surveys of recreational fishing and found to be substantially less than the commercial take. This meets the requirements of the SG 80 level.</p>	
References		Bice, 2010 a, b; Ferguson, 2010a, 2012b and 2013; Ferguson and Mayfield, 2006; Ferguson and Ward, 2011; Ferguson and Ye, 2012; Ferguson et al., 2008, 2011; Fowler, 2012 (MSF status report); Higham et al., 2005; Jones, 2009; Knight and Tsolos, 2012; Ward et al., 2010; Ye, 2005	
OVERALL PERFORMANCE INDICATOR SCORE:			<u>Pipi</u> 90

PI 1.2.3	Relevant information is collected to support the harvest strategy	
		<u>Mulloway</u> 90 <u>Golden Perch:</u> 90 <u>Yellow-eye Mullet:</u> 80
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 1.2.4

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
	Met?		<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y Yellow-eye Mullet: Y	<u>Pipi</u> : Y <u>Mulloway</u> : N <u>Golden Perch</u> : N Yellow-eye Mullet: N

PI 1.2.4	There is an adequate assessment of the stock status
Justification	<p><u>Pipi:</u> The assessment for pipi is appropriate for both the stock and the harvest control rule. It takes into account the major features relevant to the biology of the species and the nature of the fishery. It considers the fact that pipi are a generally sedentary species that inhabits a specific coastal habitat, that as a short-lived species the level of recruitment is an important driver of abundance, and that the fishery has the capacity to fish the entire local range of the population and so potentially overexploit it.</p> <p>This meets the requirements for the SG 80 and SG 100 levels.</p> <p><u>Mulloway:</u> The assessment for mulloway is appropriate for the stock and for the harvest control rule. It does not, however, currently take into account some important features of the biology of mulloway and the nature of the fishery. Specifically, although the periodic assessments examine them, the harvest control rules do not address the implications of having a legal minimum size for the major catching sector that is substantially below the size at maturity is a risky approach, or the implications of having a fishery that targets both juveniles and aggregations of adults during the spawning period. Both add to the risks for the fishery, especially in the absence of a fishery-independent index of abundance. The review of the assessment by Smith (2013) noted that although a gauntlet fishery on juveniles may be sustainable, when there was also fishing on adults the overall level of exploitation across all ages was important. Estimating this for a population with variable recruitment was difficult, required careful analysis, and has not yet been done for mulloway.</p> <p>This meets the requirements for the SG 80 level but not the SG 100 level.</p> <p><u>Golden Perch:</u> The assessment for Golden Perch is appropriate for the stock and for the harvest control rule. Nevertheless, although the periodic assessments examine the key issues, the harvest control rules do not take into account the major features relevant to the biology of the species and the nature of the fishery. For Golden Perch specifically these are the highly variable levels of recruitment, the lack of understanding of the drivers of recruitment success, and the reliance on fishery-dependent indicators.</p> <p>This meets the requirements for the SG 80 level but not the SG 100 level.</p> <p><u>Yellow-eye Mullet:</u> The assessment for Yellow-eye Mullet is appropriate for the stock and for the harvest control rule. Nevertheless, although the periodic assessments examine the key issues, the harvest control rules do not take into account the major features relevant to the biology of the species and the nature of the fishery. For Yellow-eye Mullet specifically these are the potential regional differences in size at maturity and growth, and the implications of the reliance of the assessment on fishery-dependent data.</p> <p>This meets the requirements for the SG 80 level but not the SG 100 level.</p>
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PI 1.2.4		There is an adequate assessment of the stock status		
b	Guidepost	The assessment estimates stock status relative to reference points.		
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y <u>Yellow-eye Mullet</u> : Y		
	Justification	<p><u>Pipi</u>: The assessment for Pipi estimates stock status from fishery-independent surveys and evaluates this relative to reference points. This meets the requirements of the SG 60 level.</p> <p><u>Mulloway</u>: The annual report on stock status provides the latest information on the suite of selected indicators and how these values compare with the selected reference points. This meets the requirements of the SG 60 level.</p> <p><u>Golden Perch</u>: The annual report on stock status provides the latest information on the suite of selected indicators and how these values compare with the selected reference points. This meets the requirements of the SG 60 level.</p> <p><u>Yellow-eye Mullet</u>: The annual report on stock status provides the latest information on the suite of selected indicators and how these values compare with the selected reference points. This meets the requirements of the SG 60 level.</p>		
c	Guidepost	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y <u>Yellow-eye Mullet</u> : Y	<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y <u>Yellow-eye Mullet</u> : Y	<u>Pipi</u> : N <u>Mulloway</u> : N <u>Golden Perch</u> : N <u>Yellow-eye Mullet</u> : N

PI 1.2.4	There is an adequate assessment of the stock status
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Pipi:
A major uncertainty for the assessment of Pipi is the level of recruitment that will occur over a fishing season. The assessment for Pipi does provide an estimate of the proportion of sub-legal size animals which is incorporated into the harvest strategy.

The assessment for Pipi takes uncertainty about the level of future recruitment into account by considering whether or not sub-legal sized animals comprised at least 30 per cent of the length-frequency distribution as part of the decision rules. Uncertainty is also taken into account in the selection of a conservative relative biomass target of at least 8 kg/4.5 sq. m that should allow rebuilding of the stock.

Stock status relative to the reference points, however, is not evaluated in probabilistic way. Confidence intervals around the results of the fishery-independent survey are not used in the decision rules or in making estimates of the likelihood that reference points will be met.

This meets the requirements of the SG 60 and SG 80 levels but not the SG 100 level.

Mulloway:
The annual status reports are brief statements about the level of indicators relative to reference points. Periodically, however, more detailed assessment reports are prepared that provide more comprehensive analyses, summarise any new available information on the species and the fishery, and identify any remaining major sources of uncertainty. Currently this includes the level of post-release survival of discards (from both the commercial and recreational catch) and the reliance on fishery-dependent data sources.

The assessment for mulloway takes uncertainty into account in the adoption of a suite of independent performance indicators for the fishery, rather than relying on only one or two to monitor fishery performance. The reference points for each of these indicators also take account of uncertainty through the use of a reference period of historically observed values when setting the target and limit reference points. Stock status relative to the reference points, however, is not evaluated in probabilistic way.

This meets the requirements of the SG 60 and SG 80 levels but not the SG 100 level.

Golden Perch:
The annual status reports are brief statements about the level of indicators relative to reference points. Periodically, however, more detailed assessment reports are prepared that provide more comprehensive analyses, summarise any new available information on the species and the fishery, and identify any remaining major sources of uncertainty. Currently this includes the level of post-release survival of discards (from both the commercial and recreational catch) and the reliance on fishery-dependent data sources.

The assessment for Golden Perch takes uncertainty into account in the adoption of a suite of independent performance indicators for the fishery, rather than relying on only one or two to monitor fishery performance. The reference points for each of these indicators also take account of uncertainty through the use of a reference period of historically observed values when setting the target and limit reference points. Stock status relative to the reference points, however, is not evaluated in

PI 1.2.4		There is an adequate assessment of the stock status		
d	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			<u>Pipi</u> : N <u>Mulloway</u> : N <u>Golden Perch</u> : N <u>Yellow-eye Mullet</u> : N
	Justification	<p><u>Pipi</u>: The assessment has not been tested and shown to be robust. It is in the early stage of implementation and, although alternative hypotheses and assessment approaches may have been considered in the development of the fishery-independent survey, there is no evidence that these have been rigorously explored.</p> <p>This does not meet the requirements of the SG 100 level.</p> <p><u>Mulloway</u>: The assessment has not been tested and shown to be robust nor is there evidence that alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>This does not meet the requirements of the SG 100 level.</p> <p><u>Golden Perch</u>: The assessment has not been tested and shown to be robust nor is there evidence that alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>This does not meet the requirements of the SG 100 level.</p> <p><u>Yellow-eye Mullet</u>: The assessment has not been tested and shown to be robust nor is there evidence that alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>This does not meet the requirements of the SG 100 level.</p>		
e	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		<u>Pipi</u> : Y <u>Mulloway</u> : Y <u>Golden Perch</u> : Y	<u>Pipi</u> : N <u>Mulloway</u> : Y <u>Golden Perch</u> : N

PI 1.2.4		There is an adequate assessment of the stock status	
		Yellow-eye Mullet: Y	Yellow-eye Mullet: N
	Justification	<p><u>Pipi:</u> All publications by SARDI Aquatic Sciences, including those containing stock status reports and stock assessments, are subject to an internal review process. Reports on any components of assessments that are funded externally, such as by FRDC, and publications in scientific journals are also subject to an additional external review process.</p> <p>The assessment itself, however, has not been subject to external peer review.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p> <p><u>Mulloway:</u> All publications by SARDI Aquatic Sciences, including those containing stock status reports and stock assessments, are subject to an internal review process. Reports on any components of assessments that are funded externally, such as by FRDC, and publications in scientific journals are also subject to an additional external review process.</p> <p>The assessment itself has also recently been subject to external peer review (Smith, 2013).</p> <p>This meets the requirements of the SG 80 and SG 100 levels.</p> <p><u>Golden Perch:</u> All publications by SARDI Aquatic Sciences, including those containing stock status reports and stock assessments, are subject to an internal review process. Reports on any components of assessments that are funded externally, such as by FRDC, and publications in scientific journals are also subject to an additional external review process.</p> <p>The assessment has not been subject to external peer review.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p> <p><u>Yellow-eye Mullet:</u> All publications by SARDI Aquatic Sciences, including those containing stock status reports and stock assessments, are subject to an internal review process. Reports on any components of assessments that are funded externally, such as by FRDC, and publications in scientific journals are also subject to an additional external review process.</p> <p>The assessment has not been subject to external peer review.</p> <p>This meets the requirements of the SG 80 level but not the SG 100 level.</p>	
References		Ferguson and Ward, 2011; Ferguson and Ye, 2012; Higham et al., 2005; Ward et al., 2010; Smith, 2013	
OVERALL PERFORMANCE INDICATOR SCORE:			

PI 1.2.4	There is an adequate assessment of the stock status	
		<u>Pipi:</u> 85 <u>Mulloway:</u> 85 <u>Golden Perch:</u> 80 <u>Yellow-eye Mullet:</u> 80
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.1.1

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	Y	Y	N

PI 2.1.1	The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species			
	Justification	<p>The LCF targets seven main native species: Mulloway, Black Bream, Yellow-eye Mullet, Greenback Flounder, Pipi, Golden Perch, and Bony Bream. Of these, four species (Mulloway, Yellow- eye Mullet, Pipi, and Golden Perch) are the subject of assessment in P1 as a unit of certification. The retained target species for consideration in P2 are therefore Black Bream, Greenback Flounder and Bony Bream. Two non-native species are also targeted in the fishery – carp and redfin – but these are not further considered in this assessment.</p> <p>Of the retained target native species to be assessed in P2, only Bony Bream yield levels of catch that can be considered as ‘main’ retained target species. Over the last 6 years, Bony Bream yielded annually around 400 t (the largest catch in the fishery). However, while Bony Bream comprises more than 50% of the catch in most years it is a low-value product (mainly sold for bait), yielding only about 10% of total value from the fishery catch of finfish. Bony Bream is a freshwater species, and is considered to be highly productive and there are no concerns for viability of the population resulting from the small catch relative to the presumed population size (ESD Report, draft).</p> <p>The additional species considered to be ‘retained’ are Greenback Flounder and Black Bream. The population of Greenback Flounder is considered to be heavily dependent on water flows (Ye et al., 2012), and while it is considered to be longevity overfished (Ferguson et al., 2013), it is not considered to be particularly vulnerable to the either the direct impacts of the fishery or indirect impacts of the fishery on recovery of populations in times of high water flows.</p> <p>Stock summary data indicates that Greenback Flounder have breached their upper reference point (in CPUE) in 2011-12 (Stock Summary Report, 2013). However, it is expected to respond positively to the major water inflows of the past 2 years, and there are no major concerns for population sizes. Nonetheless, Ferguson et al 2013 note that the size/age distribution in the Greenback Flounder population is likely to be highly skewed, with catch mainly (>90% in 2011-12) comprising 2-yr old or younger females (maximum age estimated to be 7 years) (Stock Summary Report, 2013).</p> <p>Both Bony Bream and Greenback Flounder are considered highly likely to be within biologically based limits, expressed as having the biological capacity to recovery strongly from low flow conditions when high flow conditions arrive. However, this does not extend to a ‘high degree of certainty’ as at least Greenback Flounder has breached a reference point, and it is unclear how Black Bream will respond/recover to high-flow conditions (an appropriate rate of response/recovery in high flow conditions is one consequence of appropriately set reference points for the species).</p>		
b	Guidepost			Target reference points are defined for retained species.
	Met?			Partial

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species		
	Justification	Reference points are established for Black Bream and Greenback Flounder (Stock Status Report, 2013), but not Bony Bream. While not depleted, both Black Bream and Greenback Flounder are considered to have been possibly longevity overfished (Ferguson et al., 2013), and although their population size and structure are probably also related to flow regimes, their population resilience, and possibly recovery trajectory, may be improved by specific fishery measures designed to recover/retain more natural population structures, specifically older age classes.		
c	Guidepost	If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.	If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	N/A	N/A	
	Justification			
d	Guidepost	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.		
	Met?	N/A		

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species	
	Justification		
References		Ferguson, 2010a; Ferguson,2007; Stock Status Report 2013 (SARDI, unpublished: provided in confidence); Ye et al., 2012; Ferguson et al., 2013; ESD Report, Draft (to be published in the Management Plan when released for public comment)	
OVERALL PERFORMANCE INDICATOR SCORE:			85
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 2.1.2

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing retained species.
		Met?	Y	Y
	Justification	<p>The main retained target species (Bony Bream) is within the fisheries management system, and is subjected to annual stock status reports, but does not have a set of catch-based reference points assigned.</p> <p>The risks from fishing to this species are expected to be reviewed on a 5-year cycle. There is therefore a strategy in place that is expected to maintain the main retained species at levels that are within biologically based limits, and ensure that the fishery does not hinder their normal biological dynamics or responses in the event of high flow conditions.</p> <p>Both Black Bream and Greenback Flounder (retained) are within the management system, have stock status reports, and have reference points set and reviewed annually.</p>		

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	N
	Justification	The annual stock status reporting system provides data on catch and CPUE patterns and assessment against reference points for two of the three retained targeted species. In addition, it is expected that there will be repeated (both annually against reference points for two species) and 5-yr risk assessments conducted for all species to meet the national assessment and reporting requirements. Populations have largely been within reference points in recent years, although the effectiveness of the strategy is somewhat unclear, given that the reference points are derived mainly from catch history.		
c	Guidepost		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	Reference points have been determined, and there is reporting against them for two of the three retained targeted species. For Bony Bream, catch and CPUE is annually reported. This strategy is being implemented successfully on an annual basis to provide input to the stock status reports.		
d	Guidepost			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species		
	Justification	<p>The pattern of reference point achievement has been maintained for a number of years for the retained targeted species. Exceedance of the CPUE high level reference point probably mainly reflects the impact of river flows and the difficulty of establishing upper limit reference points in such a dynamic ecosystem, with highly variable water inputs that are the principal driver of population response dynamics.</p> <p>Increased catch of Greenback Flounder (2011-12) in response to high river flows (Stock Status Report, 2013) provides empirical evidence of population response and higher levels of availability to the fishery, and confirms the effectiveness of the present fishery strategies for maintaining the populations of at least one target species. Black Bream are slower to respond, and it is expected that there will be subsequent increases for this species.</p>		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification			
References		Stock Status Report, 2013		
OVERALL PERFORMANCE INDICATOR SCORE:				95
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.1.3

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	The three retained target species (Bony Bream, Greenback Flounder, Black Bream) are within the fisheries management system, but only Greenback Flounder and Black Bream are subjected to annual stock status reports against a set of catch-based reference points. The system however provides routine information about contemporary catch and effort relative to historical catch and effort for all three species, including Bony Bream (main retained).		
b	Guidepost	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	Met?	Y	Y	N
	Justification	The information is sufficient for Greenback Flounder and Black Bream in respect of the reference points that have been established, although the lack of reference points for Bony Bream limits the extent to which risks to this species can be determined. However, for Bony Bream, the information base provided by the time series of catches and CPUE is sufficient to provide a satisfactory indicative estimate of outcome status for this small species, which is a very widespread and highly environmentally resilient species in Australian waterways, and typically very abundant and highly fecund where they occur (Gomon, 2011). The species is also considered to be able to reproduce successfully independent of flooding, and to have an exceptional capacity for rapid population recovery from stress (Puckridge and Walker, 1990).		

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species		
c	Guidepost	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N
	Justification	The information is not fully adequate to achieve a high degree of certainty in determining strategy success for Bony Bream – there are no reference points, only catch and effort, consistent with a partial strategy (SG80).		
d	Guidepost		Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	Met?		Y	N
	Justification	The information is sufficient detail for Greenback Flounder and Black Bream (SG100), and for the Bony Bream the periodic use of risk assessments based on fishery catch/effort data is adequate to assess ongoing levels of risk to this species (SG80).		
References		Stock Status Report, 2013; Ferguson et al., 2013; Gomon, 2011		
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.1

PI 2.2.1		The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	Met?	Y	Y	N
	Justification	<p>There are very few bycatch (non-retained) species taken in this fishery, and even these are taken in only low numbers. Although there is very limited independent observational data on bycatch, the fishery is considered to occasionally catch and retain (as byproduct) crabs, shrimps, rays, skates, sharks, as well as some finfish (ESD Report, draft). However, apart from the finfish, these other species are caught only in negligible numbers.</p> <p>Detailed information on bycatch species is limited to observations on retained and discarded fish species quantified in one study (53 observer trips, 800 net shots). This study, considering net fishing only, identified 26% (by number) of the total catch as discards (Ferguson, 2010a). The study recorded 21 species captured in total, with the discards comprising negligible numbers of 12 species of non-target fish and crustaceans, one pelican and one cormorant. Three of the species were retained as non-target but retained species: Australian Salmon, Jumper Mullet and Congolli; but they collectively comprised only about 6% of the total numbers in the observed catches. About 28% of all animals discarded were alive, although the level of post-release mortality is highly uncertain, and likely to be species-specific. Even so, none of these discard species display any particular vulnerability to population impacts from the fishery, and based on this study, it would appear that there are no 'main' bycatch species that can be identified as significantly impacted by this fishery.</p> <p>Nonetheless, the information base is limited, and there remains significant uncertainty about the information used to determine both the species composition of bycatch across the whole fishery and the extent and impact of discarding. So, although the currently understood bycatch does not contain species that were determined to be 'main', and all the ones noted to be bycatch are highly likely to be within biological limits (so meeting SG80), this cannot be accorded a high degree of certainty (SG100). [The uncertainty about the extent and composition of bycatch is assessed in 2.2.3 below].</p>		

PI 2.2.1		The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups		
b	Guidepost	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	NA	NA	
	Justification	There are no 'main' bycatch species that have been determined for this fishery.		
c	Guidepost	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.		
	Met?	NA		
	Justification			
References		Ferguson, 2010a; ESD Draft report		

PI 2.2.1	The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups	
OVERALL PERFORMANCE INDICATOR SCORE:		80
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.2.2

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing and minimizing bycatch.
	Met?	Y	Y	Y
	Justification	There are no 'main' bycatch species, but bycatch as a whole is constrained by both gear and deployment restraints used in the fishery and required within access/licence conditions. There is no specific and separate bycatch strategy, since the fishing strategies incorporate measures to minimize bycatch. The effectiveness of these arrangements is assessed on a periodic basis through the conduct of bycatch studies and risk assessments.		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	N

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
	Justification	Ferguson, 2010a demonstrated that the gear and deployment constraints are effective in limiting bycatch, but that study was conducted within a limited timeframe and focused on one specific aspect of the fishery (bycatch of finfish) in a limited area of the fishery. Therefore the data provide objective support for fishing strategies that result in a limited bycatch in the fishery (SG80), but there has been only limited testing, and this does not provide a high level of confidence (SG100).		
c	Guidepost		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	The bycatch strategies are embedded within the fishing strategies, and are fully deployed across the fishery, so meeting SG100.		
d	Guidepost			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y
	Justification	Ferguson, 2010a demonstrated that the gear and deployment constraints are effective in limiting bycatch, but this study was conducted within a limited timeframe and focused on one specific aspect of the fishery (bycatch of finfish) in a limited area of the fishery. Therefore the available data provide some objective support for a limited bycatch in the fishery (inferring that the strategies in place are modestly effective) but they do not provide a high level of confidence that this situation applies across all gear types and spatial/temporal aspects of the fishery. Nonetheless, this is consistent with 'some evidence', and meets the SG100.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				95
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.3

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Qualitative information is available on the amount of main bycatch species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery.	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	The Ferguson 2010a study provides some limited qualitative and quantitative evidence to identify the main bycatch species (none meet the MSC criteria for 'main'), and to report on their level of catch across the fishery, so meeting SG80. However, there are no verifiable and accurate (fishery-independent) data on bycatch or species level consequences, so this does not meet SG100.		
b	Guidepost	Information is adequate to broadly understand outcome status with respect to biologically based limits [for the main bycatch species].	Information is sufficient to estimate outcome status with respect to biologically based limits [for the main bycatch species].	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty [for all bycatch species].
	Met?	Y	Y	N
	Justification	There are no bycatch species that meet the criterion for designation as 'main'. The information in Ferguson 2010a is sufficient to estimate outcome status for a (probably) limited subset of bycatch species in the fishery, but does not provide a comprehensive set of data and information that represents bycatch across all the fishery operations. By inference from the data that does exist, there is broadly an adequate level of knowledge to infer that bycatch in the fishery does not have a level or composition that would breach biologically-based limits, expressed as capacity for each individual species to recover normally from low flow conditions when high flow conditions return to the fishing areas. However, the information is limited in scope (space, time and gear type) and is not sufficient to estimate outcome status for the full range of bycatch species (so not meeting SG100).		

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
c	Guidepost	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage [bycatch] species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N
	Justification	The available information (Ferguson, 2010a) provides an adequate basis to confirm the adequacy for partial strategies for managing bycatch. There are no 'main' bycatch species identified for the fishery at this time, although this assignment has a limited level of certainty.		
d	Guidepost		Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
	Met?		N	N
	Justification	The data on bycatch is derived from a single study of the fishery, supported by fishery-dependent logbook records. There is no current ongoing program of independent observation of bycatch across the fishery, or system of synthesis and reporting that might be capable of detecting and triggering response action in the event of an increase in risk to bycatch species (either all or 'main', as defined by MSC).		
References		Ferguson, 2010a		
OVERALL PERFORMANCE INDICATOR SCORE:				75
CONDITION NUMBER (if relevant): 5				

PI 2.2.3	Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch	
	<p>By the second surveillance audit provide evidence to the CAB that an ongoing fishery independent bycatch observation/ reporting program, to detect any increase in risk to bycatch species, has been implemented, of a design suitable for the scale of the fishery.</p> <p>This may include an independent local volunteer from the region, with an agreed design, process and reporting framework (agreed with CAB). This would supplement the ETP – PIRSA compliance reports for ETP species.</p>	

Evaluation Table for PI 2.3.1

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
	Met?	NA	NA	NA
	Justification	There are no quantitatively-expressed national or international requirements for the protection and rebuilding any of the ETP species that this fishery interacts with.		
b	Guidepost	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Y	Y	N

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species		
		The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
	Justification	At least 11 species of nationally-recognised ETP species are caught or interact with the fishery at various times. However, the risks of the fishery to these species have been rated as low or negligible (ESD report, draft March 2011, page 71), and in addition to the low numbers of reported catch, all ETP species reported as bycatch have been released alive (Tsolos and Boyle, 2013). Amongst these, New Zealand Fur Seals are known to predate on animals (particularly the target species) caught in nets used in this fishery, but they are normally not captured, and usually escape alive. Pelicans and cormorants can be entangled in the nets, and while it is said that most are released alive, this has been independently observed in only one study (Ferguson, 2010a). In relation to other birds, the Ecological Risk Assessment for birds (Stoklosa, 2013) found that the risks from the fishery were negligible to the national-listed bird species most likely to be vulnerable to disturbance from fishing operations (Fairy Terns, Hooded Plover). Sharks and dolphins are only very rarely seen in the fishery area inside the Lakes and Coorong, and are not captured. As a result, the fishery is considered to have only slight to negligible direct effects, and is highly unlikely to create unacceptable impacts to any ETP species. However, this does not extend to ‘a high degree of confidence’, as there has been only a limited extent of fishery-independent observation of bycatch, and so the fishery does not meet SG100 in this respect.		
c	Guidepost		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		Y	Y
	Justification	Indirect impacts on birds are considered to be very minimal, to negligible (Stoklosa 2013). In respect of other ETP species, taking into account the very limited direct interactions, the extent of indirect interactions is likely to also be negligible. The very low level of interaction infers that the indirect impact, via such mechanisms as trophic interactions, food subsidy, etc. are very likely to be negligible. This is consistent with a high degree of confidence that there are no significant detrimental indirect effects of the fishery, consistent with SG100.		
References	Ferguson, 2010a; Stoklosa, 2013; Tsolos and Boyle, 2013; ESD Report Draft, March 2011			
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.3.2

[Not Used: Alternate PI2.3.2 used]

PI 2.3.2		The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. 		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	(Y/N)	(Y/N)	(Y/N)
	Justification	[Note: Insert as much text as required to justify the SG level achieved for this scoring issue]		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.

PI 2.3.2		The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. 		
	Met?	(Y/N)	(Y/N)	(Y/N)
	Justification	[Note: Insert as much text as required to justify the SG level achieved for this scoring issue]		
c	Guidepost		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		(Y/N)	(Y/N)
	Justification	[Note: Insert as much text as required to justify the SG level achieved for this scoring issue]		
d	Guidepost			There is evidence that the strategy is achieving its objective.
	Met?			(Y/N)
	Justification	[Note: Insert as much text as required to justify the SG level achieved for this scoring issue]		
References		[List any references here]		
OVERALL PERFORMANCE INDICATOR SCORE:				Not used
CONDITION NUMBER (if relevant):				

The team shall evaluate the ETP species management strategy for the fishery under PI 2.3.2 Alternate (CR Table CB15a) where there are no requirements of protection and rebuilding provided through national ETP legislation or international agreements. *(Reference: CR CB3.12.3)*

Delete Evaluation Table PI 2.3.2 Alternate below for assessments where it is not applicable

Evaluation Table for PI 2.3.2 Alternate

PI 2.3.2A		There is a strategy in place for managing ETP species that is designed to ensure the fishery does not hinder the recovery of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There are measures in place that are expected to ensure the fishery does not hinder the recovery of ETP species.	There is a partial strategy in place that is expected to ensure the fishery does not hinder the recovery of ETP species.	There is a strategy in place for managing ETP species, to ensure the fishery does not hinder the recovery of ETP species.
	Met?	Y	Y	N
	Justification	The input control measures (particularly gear types) in the fishery provide an effective although partial strategy for controlling direct interaction with ETP species (Ferguson, 2010a). Beach access for fishers in the Pipi component of the fishery is limited to hard sand surfaces suitable for vehicle travel, away from the important Fairy Tern and Hooded Plover nesting areas which are normally in soft sand higher in the dunes, and so further from vehicle disturbance. Access to specific Fairy Tern nesting sites is also closely managed by terrestrial park rangers to avoid disruption from vehicles used by fishers to access the beach for Mulloway fishing (Stoklosa, 2013). These measures are expected to, amongst other outcomes, prevent the fishery from hindering the recovery or normal population dynamics of any ETP species that may potentially be affected by the fishery activities, consistent with SG80.		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work.
	Met?	Y	Y	N

PI 2.3.2A		There is a strategy in place for managing ETP species that is designed to ensure the fishery does not hinder the recovery of ETP species.		
	Justification	The fishery constraints have been found to limit the catch of ETP species (Ferguson, 2010a) and the impacts of beach access (Stoklosa, 2013) are considered by bird experts to be not significant. This is consistent with at least some objective basis for expecting the fishery constraint measures in regard to ETP species to be effective, consistent with SG80.		
c	Guidepost		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring.
	Met?		Y	N
	Justification	There is limited fishery-independent monitoring of impacts on ETP (conducted by PIRSA Compliance) which confirms the very low rate of ETP impact/catch from fishing gear. Experts consulted for the bird ERA did not consider that the fishery activities (fishery vehicles accessing the beach for Pipi and Mulloway fishing) had any significant impact on Fairy Terns or Hooded Plovers, and there were no obvious trophic linkages that would lead to indirect negative impacts from biomass removal by the fishery. The detailed and extensive analysis of the ecosystems of the Lakes and Coorong, and the assessment of drivers of change related to water flows (Lester et al., 2011), did not include fishery removal of biomass as a factor that influenced the ecological condition, and this infers that in determining flow-related drivers of the ecosystems, removal of biomass by the fishery was considered not to have any significant trophic impact on the ecosystems to the extent that the impacts of fishing needed to be included in any of the scenarios/models tested in relation to water flows. This evidence is consistent with SG80 and some aspects of SG100.		
References		Ferguson, 2010a; Stoklosa, 2013; Lester et al., 2011.		
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.3.3

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	Met?	Y	Y	N
	Justification	<p>The available information base, while limited, indicates a very low rate of interaction for all ETP species known to exist in the region of the fishery, with the exception of interactions with the NZ Fur Seal, which remove fish from the gill nets. No seal mortalities have been recorded, and the small number of physically entangled animals reported by fishers are released alive (to ensure the safety of the fishers). The extent and intensity of fishing activities are highly unlikely to hinder the recovery of the seal population. Impacts of fishing on the NZ Fur Seal are listed as 'low or no concern' in relation to the populations in the South-west Commonwealth Marine Planning Region (the eastern boundary for which is adjacent to the Coorong). In relation to birds, the spatial/gear type patterns in the fishery are well known, and as a result there is no likely disruption of bird breeding/feeding/roosting areas. Information on direct catch of ETP species is available from a one-off study of net interactions (Ferguson, 2010a). Fishery-independent observations provided by PIRSA Compliance (Q3/Q4 report 2012/13) indicate that there is likely to be potential for ETP birds to be caught in unattended or discarded fishing gear, although this has been rarely reported. Trophic (indirect) impacts of the fishery on ETP birds that use the Coorong are highly likely to be negligible (Stoklosa, 2013). Sufficient information is therefore available to make quantitative estimates of the impacts of fishing, consistent with SG80, however this does not permit a 'high degree of certainty' (as in SG100).</p>		
b	Guidepost	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Y	Y	N

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 		
	Justification	Evidence is summarized in Guidepost a above.		
c	Guidepost	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	Y	Y	N
	Justification	The information base derived from the ongoing reports from PIRSA Compliance in relation to ETP bycatch, if upgraded to be specific about ETP species, is sufficient to inform any further corrective measures that may need to be invoked within the fishery management system or within the fishery practices, given the limited extent of ETP interactions and potential for population effects. This is consistent with SG80.		
References		DSEWP, 2012; Ferguson, 2010a; Stoklosa, 2013; PIRSA, 2013e		
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.1

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	Met?	Y	Y	Partial
	Justification	<p>Most disturbance to habitat is created by the pipi component of the fishery, which uses hand rakes to expose the Papis from the sand for hand collection. There has been no detailed study of this impact that could be used to assess the significance of this disturbance, but it is likely to be minor, and not approach the level of serious or irreversible harm, as the fishing effort is focused on the highly energetic and structurally dynamic, largely intertidal, beachwash zone of the surf beach. However, the fishing effort is focused around the river mouth, where there normally would be a beach zone infauna, and it is likely that there would be some minor impacts on such species as the obligate polychaetes of this zone. The lack of studies of this potential impact means the pipi fishery does not meet the requirement of SG100, in terms of impact of hand raking on habitat function.</p> <p>The mesh nets in the fishery do not routinely make contact with the seabed, and even then only in sand areas where there is low likelihood of intersecting with algae, seagrass or any rocky or other structural habitat features. The water column habitat is highly unlikely to be functionally affected, since only small quantities of biomass, relative to overall biomass, are likely to be removed, and there is no impact on smaller organisms, such as plankton, small fish or invertebrates that drive the productivity of the water column.</p> <p>The use of large-mesh (swinger) nets on the ocean beach may have a small impact on the shallow shoreline waters, but this unlikely to be of lasting significance, either structurally or functionally, as nets are deployed within the high energy waters (<20 m depth) of the surf zone/beach system.</p> <p>These measures are both input controls and fishery practice, are consistent with the intent of SG80, and meet part of SG100 (there is a lack of data on the impact of hand raking on the surf zone habitats where Papis are fished).</p>		
References	Lakes and Coorong Fishery Operator User Guide 2011-2012.			
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.2

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	Met?	Y	Y	Y
	Justification	The gear type constraints and the way in which these gears are deployed in relation to the sensitivity of the habitats effectively constitute an input control strategy that has the effect of limiting contact of gear with habitats that might be sensitive to disturbance, and permits active disturbance where the habitat (surf zone seabed) is less sensitive to the ecological effects of structural or functional disturbance. While this is perhaps unintended to some extent, the strategy applies to all forms of fishing undertaken and is complete across gear types and spatial areas, consistent with SG100.		
b	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	Met?	Y	Y	N
	Justification	While there is no testing/data about the success of the strategy, there is a strict compliance regime, involving regular inspections by PIRSA compliance officers, checking that fishing gear meets the constraints imposed by the Act. Equally, the spatial areas for reporting are well defined and easily recognized on the water (assisting with spatial accuracy of reporting). This provides objective evidence and partial confidence that the strategy will operate effectively to protect habitats, consistent with the intent of SG80.		

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types		
c	Guidepost		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	Routine compliance reports from PIRSA confirm that the fishery constraints in relation to gear requirements and space/time operation of the fishery generally remain in compliance, consistent with SG100.		
d	Guidepost			There is some evidence that the strategy is achieving its objective.
	Met?			N
	Justification	Routine compliance reports from PIRSA confirm that the fishery constraints in relation to gear requirements and space/time operation of the fishery generally remain in compliance, but this is not across all aspects of the fishery, and in relation to specific gear types, is not consistent with SG100. While there is no evidence that this compliance is also protecting the surf zone where the Pipi fishery operates, the risk to habitat structure and function is likely to be negligible, and the risk to birds from vehicle traffic and fisher presence is negligible.		
References		PIRSA 2012g, h; PIRSA 2013d,e		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.3

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	Y	Y	Y
	Justification	There are detailed maps and descriptions of the relevant habitats where the fishery operates, with excellent detail on distribution and vulnerability to environmental pressures, as a result of the major ecological studies conducted in the Lakes and Coorong region over the last 5 or so years (Lester et al., 2011). This level of detail is consistent with the SG100 for this scale of fishery.		
b	Guidepost	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	Met?	Y	Y	N
	Justification	The distribution of the fishery gear types, timing and extent of interaction in relation to each habitat type is well known, consistent with the SG80. However, the physical impacts of hand raking of Papis, while thought to be insignificant, have not been fully quantified, so not meeting the SG100.		

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
c	Guidepost		Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Changes in habitat distributions over time are measured.
	Met?		Y	Partial
	Justification	The input control strategy includes spatial controls on the use of gear, monitored by PIRSA Compliance officers in a routine program of fishery surveillance. While these are input measures, the outcome metrics (such as change in habitat distribution or quality) cannot be fully estimated in relation to specific fishery impacts because of the major overriding influence of flow regime. Some changes in habitat distribution have been measured over the last 5 years, in relation to the impacts of flow regime (Lester et al., 2011). This is consistent with the SG80, and partially consistent with SG100 for a fishery of this scale.		
References		Lester et al., 2011.		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.5.1

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
		Met?	Y	Y
	Justification	<p>Ferguson et al., 2013 report on the progressive decline in species diversity of fish in the freshwater and estuarine regions of the Lakes and Coorong ecosystem. This includes a number of the key fish species that occur in the ecosystem. Lester et al., 2011 note that more than 1000 species of flora and fauna are recorded from the Lakes and Coorong ecosystem. Lester et al., 2011 establish 8 broad criteria for the continuing health of the Lakes and Coorong ecosystem, including: self-sustaining populations, population connectivity, habitat complexity and diversity, and redundancy and appropriateness of ecological function. Within the 8 criteria, 10 vegetation species/assemblages, 17 fish species and 19 macroinvertebrate species indicators of ecosystem condition were established. The fishery is considered here to have possibly greater than negligible interaction with 10 of these indicators (<30%), comprising 7 of the fish species (including 3 targeted species assessed in P1) and 3 polychaete species that may occur on the surf beach.</p> <p>The available evidence of stock status, inferring recovery of several targeted species during the recent periods of high flows, taken together with the:</p> <ul style="list-style-type: none"> ▪ maintenance of target species within reference points, ▪ limited amount and significance of bycatch, ▪ lack of habitat impacts, ▪ overwhelming dominance of flow as the ecosystem driver, and ▪ the lack of fishery-impact as a driving force in the ecosystem models developed to assess different flow regimes (inferring only a minor role in influencing ecosystem structure and function relative to flow), <p>all infer that, relative to the ecosystem health indicators of Lester et al., 2011, the fishery is highly unlikely to disrupt key ecosystem structure of function to the point of serious or irreversible harm, consistent with SG80. However, the evidence for this is limited, and does not extend to providing strong support for the likelihood that the fishery is not disrupting the ecosystem to the point of serious or irreversible harm, and so is not consistent with SG100.</p>		

PI 2.5.1	The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
References	Stock Status Report, 2013; Lester et al., 2011; Ferguson et al., 2013	
OVERALL PERFORMANCE INDICATOR SCORE:		85
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.5.2

PI 2.5.2	There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function			
Scoring Issue	SG 60	SG 80	SG 100	
a	Guidepost	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	Met?	Y	Y	N
	Justification	The fishery is controlled by the management system, which may be considered to be an assemblage of measures operating within a unified strategy designed to manage the fishery to achieve both ecosystem and environmental outcomes as well as fishery production outcomes, consistent with the SG80. However, although there is now the technical basis available for the development of an environmental management plan for the fishery (drawing from Lester et al., 2011) this has not yet been undertaken, and so SG100 is not achieved.		

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
b	Guidepost	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.
	Met?	Y	Y	N
	Justification	[As for a above]		
c	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	Met?	Y	Y	Y

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function	
	Justification	The management uses reference points that are derived from catch history, and while this is suitable for the purposes of maintaining fishery production, they are not constructed to be directly applicable to the indicators of structure and function established by Lester et al., 2011 which provide a secure basis for the assessment of ecosystem condition in the Lakes and Coorong. While some of the measures (such as constraints on gear type and locations of fishing) are likely to work in respect of habitat impacts and ETP and bycatch species (to the level consistent with SG60) the measures for stock management of target species do not form a cohesive strategy that will maintain populations with age/size structures consistent with the self-sustainability of these fish populations (and so do not fully meet SG80). Ferguson et al., 2013 point to the potential for reduced resilience, and possible risks associated with maintaining some of these fish populations with truncated population structures in this ecosystem.	
d	Guidepost		There is some evidence that the measures comprising the partial strategy are being implemented successfully.
	Met?	Y	N
	Justification	As for a above	
References	Ferguson et al., 2013; Lester et al., 2011		
OVERALL PERFORMANCE INDICATOR SCORE:			85
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	Detailed studies undertaken in the last 5 years have established a good level of understanding of the Lakes and Coorong ecosystem, including flow dynamics in relation to trophic structures, relationships and dynamics (Lester et al., 2011). In particular, this work has resolved the ecosystem into a typology (for condition/health purposes) of 36 indicators comprising vegetation, fish and invertebrates, and is a key advance in ecosystem knowledge. This is adequate to meet the SG80.		
b	Guidepost	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.
	Met?	Y	N	N
	Justification	The fishery has the potential to impact 10 of the ecosystem indicators, and while limited levels of impact can be inferred (consistent with the SG60), none of these potential impacts have been studied in detail in relation to the ecosystem condition, including resilience in the long term of targeted fish populations and their linkages to other aspects of the structure and function of the ecosystem.		

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
c	Guidepost		The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.
	Met?		Y	N
	Justification	The main functions of the ecosystem components are broadly known from the recent detailed studies in relation to flow drivers for the ecosystem (Lester et al., 2011)		
d	Guidepost		Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.	Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Y	N
	Justification	The impacts of the fishery on the habitats, ETP species, and a substantive number of the ecosystem indicators established by Lester et al., 2011 are sufficiently understood to infer consequences. These are mainly negligible, because of very limited spatial overlap, and limited indirect effects, consistent with SG80. However, there is little information about the impacts of the fishery on target and retained species in relation to their ecosystem roles, specifically in relation to their long term resilience that may be impacted by the maintenance of truncated population structures by the fishery, or the effects that the fishery may have on the recovery trajectory when high flows return to the Coorong, so this does not meet the SG100.		

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
e	Guidepost		<p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p> <p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p>
	Met?		N
	Justification	<p>Sufficient data are collected on catch and effort for the targeted and retained species, and on the operation of the measures in the fishery, to meet SG80. However, there is very little data collected to inform an increase in risk flowing from a reduction in effectiveness of the catch measures designed to protect the ecosystem, and specifically the effectiveness of the reference points to maintain/enhance population structure across the range of retained/target species to meet concerns about a lack of resilience in populations of Mulloway, Black Bream and Greenback Flounder that may be constrained by the fishery operations (as expressed in Ferguson et al., 2013: constrained population structure and reduced species richness). These two issues are related - reduced abundance of larger/older individuals affects estimates of species richness, and the main ecosystem-level concern is the ongoing trend of fishery catches comprising increasingly of opportunist species with short life-spans and rapid reproduction, replacing species with longer life spans and lower rates of reproduction. The lack of data about the impacts of such changes in the ecosystem is also possibly confounded with the lack of knowledge about the catch patterns in the recreational fishery. Overall, sufficient data is not collected to detect an increase in the level of risk (in a timely manner) related to the effectiveness of the existing fishery management measures, so not achieving the SG80.</p>	
References		Lester et al., 2011; Ferguson et al., 2013	
OVERALL PERFORMANCE INDICATOR SCORE:			75
CONDITION NUMBER (if relevant): 6			
<p>By the first surveillance audit the client shall provide evidence to the CAB that a study on the main impacts of the fishery on key ecosystem elements has been developed with academic and industry collaborators. These should include an assessment of the ecological role of the truncated population structure in the trophic relationships of Black Bream and Greenback Flounder in the Coorong.</p> <p>By the second surveillance audit evidence shall be provided to the CAB that funding has</p>			

PI 2.5.3	There is adequate knowledge of the impacts of the fishery on the ecosystem	
	<p>been secured and the work program has been commenced.</p> <p>By the third surveillance audit provide evidence that the work has been conducted.</p> <p>By the fourth surveillance audit a report shall be submitted to the CAB including an assessment of the findings and a plan (including resourcing) for continuing monitoring of potential impacts.</p>	

Evaluation Table for PI 3.1.1

PI 3.1.1		<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There is an effective national legal system and a <u>framework for cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and <u>organised and effective cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and <u>binding procedures governing cooperation with other parties</u> which delivers management outcomes consistent with MSC Principles 1 and 2.
Met?		Y	Y	N

<p>PI 3.1.1</p>	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.
	<p>The LCF is essentially a single jurisdiction fishery operating under South Australian State fisheries legislation. However certain aspects of the LCF are subject to elements of Commonwealth environment protection legislation. Due to its location of the LCF at the mouth of Murray-Darling River system and in an area of RAMSAR significance a range of State, national and multi-jurisdictional legislation also applies to the area of the LCF.</p> <p>At the South Australian level the commercial component of the LCF is subject to the Fisheries Management Act 2007 (FMA 2007) the Fisheries Management (Lakes and Coorong Fishery) Regulations 2009 and the Fisheries Management (General) Regulations 2007. The existing management plan was developed under the previous South Australian Fisheries Management Act 1982 and a new Management Plan for the fishery is being developed under FMA 2007. The Recreational component of the fishery is also managed under the FMA 2007 and the Fisheries Management (General) Regulations 2007.</p> <p>The Southern Fishermen’s Association (SFA) and the Goolwa Pipi Harvesters’ Association (GPHA) are effective organisations representing commercial fishers in the LCF. They play a central role in ensuring cooperation of the industry with other elements of the management system.</p> <p>At the Commonwealth level the commercial component of the fishery is subject to assessment under Part 13 and Part 13A of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). Part 13 assessments relates to impacts on protected marine species and Part 13A assessments are made against the <i>Guidelines for the Ecologically Sustainable Management of Fisheries</i> (Department of the Environment and Water Resources, 2007) for the purposes of export approval for species taken in the fishery. These assessments have resulted in conditions being placed on the LCF. PIRSA Fisheries Division is responsible for implementation of actions to address those conditions and works cooperatively with the Australian Government Department of the Environment and Heritage (DEH)</p> <p>Other Commonwealth Legislation potentially affecting the LCF is the <i>Native Title Act 1993</i>. This Act makes the Federal Court of Australia responsible for the management and determination of all applications relating to native title in Australia. Native title describes the rights of Aboriginal and Torres Strait Islander peoples to land and waters according to their traditional laws and customs.</p> <p>The area of the LCF also falls within the jurisdiction of:</p> <ul style="list-style-type: none"> ▪ The Coorong and Lakes Alexandrina and Albert Ramsar Management Plan (Department for Environment and Heritage, South Australia, 2000) ▪ The Encounter Marine Park Management Plan 2012 (DEWNR, 2012b) ▪ The Living Murray Initiative of the Murray-Darling Basin Authority ▪ The Native Fish Strategy for the Murray-Darling Basin 2003-2013 ▪ The National Policy on Fisheries Bycatch

PI 3.1.1	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 		
Justification	<p>There is considerable cross-over in representation on the various implementing bodies for these plans/initiatives. Staff from PIRSA Fisheries Division and the South Australian Department of the Environment, Water and Natural Resources (DEWNR) and fishing industry representatives actively participate and cooperate to ensure that external requirements are implemented in the LCF and that the interests of the LCF are considered by external agencies.</p> <p>There is a framework for cooperation in place and that framework is effective and organized. However, in some cases, there is no binding procedure governing cooperation. For example, within the management system the Lakes and Coorong Consultative Committee (LCCC) established by the SFA plays a central role in ensuring cooperation with PIRSA, SARDI, DEWNR and other stakeholders. However the LCCC is an informal, non-binding arrangement.</p>		
b	<p>The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.</p>	<p>The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.</p>	<p>The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.</p>
Met?	Y	Y	Y

<p>PI 3.1.1</p>	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Justification</p>	<p>Section 111 of the FMA 2007 provides for rights of 'internal review' in relation to decisions taken by the Minister on the application for the issue or renewal of an authority to fish, the transfer of such an authority and the conditions imposed on an authority. If not satisfied with the outcome of that review the Act (section 112) provides for appeal to the Administrative and Disciplinary Division of the District Court.</p> <p>In addition to individual rights of appeal, Regulations and Management Plans made under the FMA 2007 are disallowable instruments, meaning that ultimately the South Australian Parliament may prevent them from coming into force even after approval by the Minister. This system has been tested and shown to work. For example, in 2008 the initial regulations establishing the quota management system for Pipis were disallowed in Parliament due to concerns by some members of Parliament about the equity of the system used to allocate quotas. However, after review by a Select Committee of the Legislative Council the regulations were reinstated.</p> <p>The SFA and the GPHA are active in working informally to minimise opportunities for disputes, for example by educating fishers about rules and regulations and providing advice on best practice fishing operations. The LCCC, provides a regular opportunity for fisheries managers, enforcement officers, industry and other stakeholders to discuss matters and identify issues that require addressing. Similarly, PIRSA fisheries Division is proactive in seeking to minimise disputes by making one on one sessions with fisheries enforcement officers available for new entrants into the fishery.</p> <p>The legal system includes mechanisms for the resolution of legal disputes. Those mechanisms are transparent and are considered effective in dealing with most issues in the fishery. The mechanisms have been tested and proven to be effective.</p>

PI 3.1.1		<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 		
d	Guidepost	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
Met?		Y	Y	Y

PI 3.1.1	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 	
Justification	<p>The FMA 2007 provides:</p> <ul style="list-style-type: none"> ▪ For the development by the Minister and a native title group that is party to an indigenous land use agreement, of an aboriginal traditional fishing management plan for the management of specified aboriginal traditional fishing activities in a specified area of waters; and ▪ for the views of signatories to indigenous land use agreements (an indigenous land use agreement registered under Part 2 Division 3 of the Native Title Act 1993 of the Commonwealth) to be taken into account in the development of commercial fisheries management plans. <p>The local Indigenous people in the area of the LCF are the Ngarrindjeri people. Rather than develop an Indigenous land use agreement with the South Australian government, in 1998 the Ngarrindjeri people lodged a native title claim with the National Native Title Tribunal (Tribunal File No. SC98/4) (Ngarrindjeri Tendi <i>et al.</i>, 2006). The claim area includes waters of the LCF.</p> <p>The National Native Tribunal helps people to resolve native title issues and to make agreements about the use of land. The <i>Native Title Act 1993</i> encourages negotiation and agreement. Determinations about native title by the Federal court of Australia are binding.</p> <p>At the South Australian level, the FMA provides a mechanism that respects, observes and formally commits to the legal rights of indigenous people dependent on fishing for food or livelihood. The national <i>Native Title Act 1993</i> provides an alternative mechanism for formal assessment of and for the making of formal binding decisions about native title rights to areas of land and water.</p> <p>The management system has a mechanism to generally respect, observe and formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	
References	DEH, 2000; Department of the Environment and Water Resources, 2007; DEWNR, 2012a; Ngarrindjeri Tendi, Ngarrindjeri Heritage Committee, Ngarrindjeri Native Title Management Committee, 2006	
OVERALL PERFORMANCE INDICATOR SCORE:		95

Evaluation Table for PI 3.1.2

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties.		
		The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
		Met?	Y	Y
	Justification	<p>The key organisations involved in the management process of the LCF are:</p> <ul style="list-style-type: none"> ▪ The Minister for Fisheries ▪ The Fisheries Council of South Australia (Fisheries council) ▪ PIRSA Fisheries Division ▪ South Australian Research and Development Research Institute (SARDI) ▪ LCCCF <p>The functions, roles and responsibilities of the Minister, the Fisheries Council and PIRSA Fisheries Division are prescribed in the FMA 2007. SARDI is the research arm of PIRSA and provides research and monitoring programs for the LCF. The annual cost recovery process requires clear specification of the services to be provided by SARDI and by PIRSA Fisheries Division to the net sector and to the pipi sector of the LCF. While the LCCF is not a formal body its role and function is clear and specified in terms of reference.</p> <p>The organisation and individuals identified in the management process are identified. Functions, roles and responsibilities are well understood and explicitly defined for all areas of responsibility and interaction.</p>		

PI 3.1.2		<p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p>		
b	Guidepost	<p>The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.</p>	<p>The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.</p>	<p>The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.</p>
		Met?	Y	Y

<p>PI 3.1.2</p>	<p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Justification</p>	<p>At the broad level the FMA 2007 prescribes consultation processes for the development of management plans. These processes are comprehensive and inclusive and ensure that information provided by consultation is considered.</p> <p>PIRSA Fisheries has managed fisheries in partnership and in consultation with the fishing industry and other key stakeholders over many years. Prior to the FMA 2007 this was largely driven through fisheries management committees. PIRSA (2012b) acknowledges that the consultative co-management approach in place has not always prevented conflicts between Government, the industry and other stakeholders and that a collaborative environment, making better use of collective knowledge and experience is required.</p> <p>There is no longer a formal fisheries management committee in place for the LCF. PIRSA Fisheries has a communication protocol with the net sector of the LCF, through the SFA, and with the GPHA. The SFA's LCCC has filled the void in consultation processes. The LCCC is the main forum through which local knowledge is provided to inform the management system although other opportunities currently exist, for example through participation on the LCF Management Plan Steering Committee. The LCCC is the main consultative forum for exchange of information between managers and stakeholders and provides the main mechanism whereby PIRSA demonstrates consideration of information received.</p> <p>The management system includes consultation to obtain relevant information from the main affected parties, including local knowledge to inform the management system. Such information is sought regularly and accepted and there is some demonstration of how this information is considered. SARDI advice and Fisheries Gross Margin advice from Econsearch are provided by SFA to all quota holders for comment / direction prior to the Lakes and Coorong Management Plan Steering Committee determining the advice to the Executive Director of Fisheries. However, there are some concerns that the system does not necessarily explain how the information gathered is used or not used. For example, while industry are involved in reviewing and commenting on SARDI advice on the stock status of Pipis and involved in discussions on the appropriate total allowable commercial catch, the advice ultimately provided to the Minister is not shared with industry. It therefore remains unclear how or if industry's views were used in formulating the advice to the Minister. Further, and it is unclear how stakeholder views (such as recreational fishers) are sought or dealt with in the construction of final advice to the Minister. As a result it cannot be concluded that the management system explains how relevant information is used or not used.</p>

PI 3.1.2		<p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p>		
c	Guidepost		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Y	N
	Justification	<p>Broad public consultation on management of the LCF is only mandated in relation to the development of management plans. Those processes are comprehensive and inclusive.</p> <p>In relation to ongoing management of the LCF, the consultation processes run by PIRSA in relation to the fishery are focused largely on industry. The LCCC, however, provides for consultation with stakeholders other than the fishing industry. Opportunities exist for other stakeholders, including environmental non-government organisations, to participate on an ad hoc basis in specific fora convened by PIRSA. The Fisheries Council of South Australia also includes representatives from the commercial and recreational fishing sectors and the conservation sector.</p> <p>The management system provides opportunities for all interested and affected parties to be involved. However across the broad range of decisions, policies and practices within the management system the consultation process does not facilitate effective engagement of these parties.</p>		
References	PIRSA, 2012b			
OVERALL PERFORMANCE INDICATOR SCORE:				85
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.3

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
		Y	Y	Y
	Justification	<p>The long-term objectives of the LCF are specified in the 2005 Management Plan which reflected the objectives of the <i>Fisheries Act 1982</i>. While a new Act came into force in 2007 the objectives of the Management Plan remain consistent with the objectives specified in the New Act.</p> <p>The Act makes explicit reference to protection of aquatic resources from over-exploitation, maintenance of aquatic habitats and ecologically sustainable development including application of the precautionary approach.</p> <p>The Management Plan includes goals of sustainable harvesting of fisheries resources and minimising impacts on the structure, productivity, function and biological diversity of the ecosystem. Application of the precautionary approach is also explicit in the Management Plan for the LCF.</p> <p>Clear long term objectives, consistent with the MSC Principles and Criteria and the precautionary approach are explicit within and required by management policy.</p>		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.4

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
		Met?	Y	Y

PI 3.1.4	<p>The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing</p>
Justification	<p>The commercial fishing industry in South Australia is obliged to meet the agreed costs of all services required to support the commercial sector, including research (biological and economic), management and compliance, as well as a range of additional services in support of the industry (PIRSA, 1995). The policy requires commercial fishery licence fees to fund 100% of commercial fisheries management costs. PIRSA consults with service providers and relevant industry associations on the fishery based management programs which form the basis of licence fees for the following licence year. Licence fees in the LCF are, therefore, calculated on a cost-recovery basis and these fees vary annually depending on research, compliance and management priorities. There is therefore, no subsidization of the management costs of the fishery.</p> <p>The fishery is subject to limited entry and access is provided by way of fishing licenses and individual transferable quota for Pipsis. However, under the existing management arrangements, fishing licenses in the LCF are renewed annually. Currently even quota allocated for Pipsis is attached to the fishing licence. The level of security in the access provided by both the licence and the quota is therefore low as is the incentive for stewardship of the resource. This is recognized by PIRSA and it is intended that the management plan under development will include terms of up to 10 years for fishing licenses and any associated pipi quota.</p> <p>This will go some way to strengthening the security of access. The access right for Pipsis, based on individual transferable quota, will continue to be a stronger access right with greater incentive for stewardship of the resource than the those in the net sector for other target species which rely on licenses linked to a range of input controls rather than to a clear share of the resource.</p> <p>There is recognition of the need to develop mechanisms that promote autonomous structural adjustment in the net sector LCF in order to allow effective management of catch and effort and for economically efficient net fishing activity while ensuring sustainability of the resources during periods of favourable and unfavourable environmental conditions. A research proposal has been developed to investigate alternative strategies to achieve this (PIRSA, 2012c).</p> <p>PIRSA believes that a stronger co-management approach that increases the responsibility of industry for management will provide a positive incentive to manage the resource sustainably and is currently considering changes to the co-management approach (PIRSA, 2012b).</p> <p>The management system provides access by way of licences and pipi quota. It recovers the costs of management from fishers. Together these mechanisms provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2 provide some incentives for sustainable fishing and seek to ensure that perverse incentives do not arise. Further, the management system is taking steps though review of the management plan to improve the security of the existing access rights and to investigate methods for improving opportunities for autonomous structural adjustment in the net sector of the fishery. The management plan is subject to 5 yearly review and this is consistent with a regular review of management policy to ensure that they are not contributing to unsustainable fishing practices.</p>

PI 3.1.4	The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
References	PIRSA, 1995; PIRSA, 2012b; PIRSA, 2012c		
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 3.2.1

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system	Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
Met?		Y	Y	Y

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2	
Justification	<p>The Management Plan (Sloan, 2005) includes four clear, specific long-term objectives consistent with MSC Principles 1 and 2. The Plan also identifies short-term objectives associated with each of these long-term goals. The Management Plan includes a harvest strategy which originally applied to all sectors of the fishery. The harvest strategy directly addresses each of the goals and sub-objectives of the Management Plan and includes management strategies, performance indicators and reference points/triggers. These will be reviewed as part of the development of the new management plan.</p> <p>The harvest strategy in the Management Plan continues to apply to the net sector of the fishery. However, since the introduction of the Plan a separate harvest strategy has been introduced for Pipsis to underpin the Pipi quota management system introduced in 2009. This harvest strategy for Pipsis (PIRSA, 2012a) has the following objectives:</p> <ul style="list-style-type: none"> • maintain a target Pipi relative biomass above 10kg/4.5 m² and not less than 8kg/4.5m² • ensuring that the Pipi relative biomass does not drop below 4kg/4.5m² • maximise fishery gross margin <p>The Pipi harvest strategy contains management strategies, biological and economic performance indicators, and biological and economic reference points and decision rules for total allowable commercial catch setting, and establishes processes and timelines for TACC decision making.</p> <p>The short and long term objectives for the fishery as a whole and for the Pipi fishery are explicit within the management system and are well defined and measurable and are demonstrably consistent with the outcomes required by MSC Principles 1 and 2.</p>		
	References	Sloan, 2005; PIRSA, 2012a	
	OVERALL PERFORMANCE INDICATOR SCORE:		
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 3.2.2

PI 3.2.2	The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
Scoring Issue	SG 60	SG 80	SG 100

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
a	Guidepost	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
		Met?	Y	Y

PI 3.2.2	<p>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.</p>
Justification	<p>As noted under 3.2.1 there is a fishery wide harvest strategy and a pipi harvest strategy in place that specify management strategies to achieve the fishery specific objectives. The fishery-wide harvest strategy includes broad management responses to breaching of reference points in terms of notification of the Minister, detailed review and consultation with key stakeholder groups. Decisions taken by the Minister (or delegate of the Minister) are required to be gazetted publicly. For target species in the LCF, other than pipi, a rolling program of stock assessments is in place and these form the primary basis upon which decisions are taken in line with the broad harvest strategy contained in the current management plan.</p> <p>The Pipi Harvest Strategy (PIRSA, 2012a) includes clear decision rules for total allowable commercial catch (TACC) setting and sets out an annual TACC decision making process and timeline. An annual, fishery-independent survey is conducted to determine the relative biomass of legal-sized pipi underpins the harvest strategy for pipi. The Minister (or delegate) has responsibility for determining the value of a quota unit on an annual basis and setting the TACC under the <i>Fisheries Management (Lakes and Coorong Fishery) Regulations 2009</i>. In the absence of a formal management committee, PIRSA manages the harvest strategy in consultation with industry. The harvest strategy requires that SARDI provide industry with an annual verbal presentation on stock status and maximum gross margin. PIRSA will then convene an annual meeting of the LCF Management Plan Steering Committee to consider the information and any feedback from industry. PIRSA then provides recommendation to the Minister, or delegate on the level of the TACC.</p> <p>The harvest strategy notes that a formal management committee for Papis may be considered in the future. In this regard it is noted that the LCF Management Plan Steering Committee has been being used somewhat opportunistically as the advisory/consultation forum on management of the Pipi sector of the LCF. PIRSA and the Steering Committee are in discussion about the formation of a new group, mirroring the membership of the current Steering Committee, which will address all LCF matters including the setting of TACCs on a longer-term basis following implementation of the Management Plan. Committee’s central task is the development of the new LCF management plan and upon finalization of the plan the committee will be disbanded. Alternative processes for consultation/advice on pipi quota will need to be formalized and established. Nevertheless the current decision-making processes result in measures and strategies to achieve the fishery-specific objectives.</p>

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
b	Guidepost	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
		Met?	Y	Y

PI 3.2.2	<p>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.</p>
	<p>The pipi harvest strategy (PIRSA, 2012a) includes clear decision rules for TACC setting and sets out an annual TACC decision making process and timeline. In contrast the fishery-wide harvest strategy contained in the management Plan does not contain decision rules and provides only broad guidance as to how a management response is arrived at. While it is clear how management will respond to serious stock issues in the pipi sector of the LCF the current harvest strategy for the rest of the LCF stocks does not provide the same level of confidence. New harvest strategies for the net sector will be developed by the LCF Management Plan Steering Committee in developing the new Management Plan.</p> <p>Industry have highlighted a lack of transparency in the development of the nature and level of services (policy, legal, licensing, compliance, stock assessment and monitoring) and therefore the industry costs associated with the LCF and with some of the processes involved in seeking Ministerial decision on key fisheries management issues (e.g. advice on pipi quota levels).</p> <p>Despite this the management system has demonstrated that it is capable of responding to serious issues. The introduction, since 2009, of management changes to both commercial and recreational fishing, and a separate harvest strategy to protect pipi stocks from over-exploitation is a prime example of this. Further, the management system has demonstrated its capacity to respond to time-bound recommendations and conditions made on the fishery by DEH² as a result of the LCF's 2008 assessment under the EPBC Act. For example, these conditions required the conduct of an ecological risk assessment of the LCF (conducted in 2011) and review of the current management arrangement for the protection of Murray cod. While work remains to be done on some conditions, DEH has acknowledged the progress made and the fishery continues to be accredited against Part 13 and 13A of the EPBC Act.</p> <p>Further, the management system has identified the need to address potential over capacity in the net sector of the fishery and is seeking to undertake research to determine the best management approach to support autonomous adjustment in this sector.</p> <p>Decisions are taken in the context of the Management Plan for the LCF. This Plan requires consideration of a range of factors including the management objectives for the target species and the interests of fishers that depend on the fishery for a livelihood as well as other users of the resource, including recreational and Indigenous fishers.</p> <p>However, the absence of formal management committees for the pipi and the net sectors of the LCF does reduce confidence that the decision making processes are responsive to all issues as they arise. The lack of documented records of the process by which decisions are arrived at, and the matters taken into account, means that it is difficult to determine how the requirements for decision making, as specified in the fishery-wide harvest strategy and the pipi harvest strategy are implemented in practice.</p>
<p>² Immediately prior to September 2013 known as the Department of Sustainability, Environment, Water, Population and Communities (DSEWPA/C)</p>	<p>The LCF's decision-making processes can and do respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and they take account of the wider implications of decisions. However the absence of documentation on decision making means that it is not possible to assess whether the fishery responds in such a way to all such issues.</p>

Justification

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.	
c	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.
	Met?		Y
	Justification	<p>The Management Plan for the LCF seeks to promote a precautionary approach to the management of the Lakes and Coorong Fishery through its harvest strategy. The harvest strategy requires that the management system “Exercise precautionary approach to management, should serious or irreversible threats to fish stocks or the wider ecosystem become apparent – particularly during periods of extended drought.”</p> <p>As input to the development of the new Management Plan an ESD risk assessment of the LCF was conducted in 2011 using the National ESD Reporting Framework for Fisheries (Fletcher et al., 2002). The methodology adopted, defaults to the highest risk rating in the absence of information to inform an assessment of risk. This is consistent with a precautionary approach.</p> <p>The management system uses an annual fishery independent survey to underpin the decision making process for Pipis. A rolling program of stock assessments together with annual status reports for all key species support the management of other target stocks. This ensures that management of target stocks is based on the best available advice. Byproduct and bycatch species were assessed under the ESD risk assessment and no species were assessed as higher than a negligible or low risk (PIRSA, 2011).</p>	

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
d	Guidepost	Some information on fishery performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Y	N	N

<p>PI 3.2.2</p>	<p>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Justification</p>	<p>Information on fishery performance and management action in the LCF is available from a number of sources. These include:</p> <ul style="list-style-type: none"> • the website of the PIRSA Fisheries Division which contains: <ul style="list-style-type: none"> ○ the Management plan for the LCF ○ a register of entitlement holders in the LCF ○ the Cost Recovery Policy that applies to the LCF and other South Australian managed fisheries ○ links to the FMA 2007 and the Fisheries Management Regulations applying to the LCF ○ copies of economic indicator reports for the LCF • the website of the Fisheries Council which contains information on initiatives introduced by the Council in relation to the LCF, e.g. the work of the LCF Management Plan Steering Committee and other broader fishery policy initiatives; • the website of the Southern Fishermen’s Association which contains information on the operation of the LCF and details of initiatives and advice provided by the SFA to its members; • the website of SARDI which contains <ul style="list-style-type: none"> ○ reports on interactions with threatened, endangered and protected species in South Australian fisheries including the LCF; ○ information and statistics reports on south Australian fisheries including the LCF ○ fishery stock status reports for the LCF ○ stock assessment reports for LCF target species • the website of DEH which contains PIRSA’s reassessment submissions to DEH and DEH’s findings including conditions and recommendations for improved performance under the EPBC Act. <p>Information on infringements of fishery rules and regulations is provided to the LCCC. While this information is not readily available to the general public there is broad stakeholder engagement on the LCCC and this information would be made available upon request.</p> <p>While there is a considerable amount of publicly available information on the fishery, there is no centralized site for accessing this information. This does not facilitate stakeholder understanding of the fishery, its management or its performance. Further, as noted earlier, there is a lack of publicly available information on the rationale for management decisions taken in the fishery.</p> <p>Some information on fishery performance and management action is generally available on request to stakeholders. However, there is a general absence explanation for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review.</p> <p>The assessment team is of the view that the proposed formation of a dedicated committee to oversee management issues relating to the LCF, following the implementation of the Management Plan, provides an opportunity for the fishery to ensure that a process is in place to demonstrate in a transparent way how and why decisions are taken on the LCF.</p>

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
e	Guidepost	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
		Met?	Y	Y
	Justification	<p>The fishery is operated by the management authority, PIRSA Fisheries Division, within the legal framework described under Indicator 3.1.1. There is no evidence that there is a repeated violation of the same law of regulation necessary for the sustainability for the fishery. There are no legal challenges to the management system.</p> <p>PIRSA acts proactively to avoid disputes through the inclusion of the fishing industry in consultation on key management matters, promoting a co-management approach to management of the fishery and providing fishers, and particularly new entrants to the fishery with information on the responsibilities and obligations in respect of fishery rules and regulations.</p> <p>The management authority does not disrespect or defy the law and there are no legal challenges to the management system. The system acts proactively to avoid legal disputes.</p>		
References		Fletcher, et al., 2002; PIRSA, 2011		
OVERALL PERFORMANCE INDICATOR SCORE:				75
CONDITION NUMBER (if relevant): 7				x
By the first surveillance audit the client shall demonstrate that processes are in place to ensure that explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity				

Evaluation Table for PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	Y

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
	Justification	<p>There is a comprehensive MCS system in place implemented by the Fisheries and Aquaculture Operations Group of PIRSA Fisheries Division. Separate compliance plans for the net and pipi sectors of the Lakes and Coorong Fishery are developed (PIRSA, 2013b, c) in consultation with fishery industry representatives. These Plans are risk based. Annual Scorecards (PIRSA, 2012d, e), reporting on activity, effort and outcomes are prepared for each of these fisheries and quarterly compliance activity reports (PIRSA, 2012f, g, h; 2013d, e) are provided to the LCCC. The attendance of a compliance officer at the Lakes and Coorong Consultative Committee allows managers and fishers to be advised of any compliance issues as they arise and to take steps to deal with these before they develop into larger problems. From time to time a fisheries officer also attends meetings of the GPHA.</p> <p>Compliance activities are conducted on land and at sea. These activities include: checks for undersize catch during fishing operations, at landing points, at processors and in transit; education campaigns and ongoing one-on-one education sessions about regulations and operator responsibilities; checks that Catch and Disposal Records (CDRs) for Pipsis are completed; and covert surveillance.</p> <p>PIRSA fisheries officers are responsible for enforcing regulations relating to both commercial and recreational fishers. Fisheries officers also engage actively in the development and review of fisheries management policy.</p> <p>There is a comprehensive MCS system in place for the LCF, tailored to the varying management styles of the net sector (input controls) and the pipi sector (catch quota). Compliance scorecards recording both enforcement activities undertaken and results, demonstrate that there is a consistent ability to enforce relevant management measures, strategies and rules.</p>		
b	Guidepost	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Y	Y	Y

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
	Justification	<p>Offences committed against the FMA 2007 are subject to legal action by the courts. In addition, offences against Regulations are subject to a demerits point scheme prescribed in the Act which may result in disqualification or cancellations of fishing entitlements. These demerits are in addition to any penalties imposed by a court.</p> <p>The compliance scorecards (PIRSA, 2012d, e) and compliance activity reports for the LCF demonstrate that convictions and fines imposed by the courts are secured for offences identified by enforcement officers and that written or verbal cautions are issued where appropriate.</p> <p>Sanctions to deal with non-compliance are in place. The available compliance information suggests that these are consistently applied and that there is a high level of compliance indicating that the sanctions provide effective deterrence.</p>		
c	Guidepost	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	Y

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	
	Justification	<p>The compliance plans for the LCF do not identify any high risk issues but include a number of moderate and low risk issues. The available compliance information suggests high levels of compliance. Fishers, predominantly through the LCCF are actively engaged in identifying mean by which compliance issues can be addressed.</p> <p>Fishers are required to provide catch and effort data to SARDI through compulsory monthly logbook returns. To collect more detailed catch information the fishery is divided into 16 areas. Data provided for finfish includes: catch, effort (man days, nets), location (i.e. area), species targeted, species caught (kg) and the port of landing. Discards are recorded for pipi and will also be added to the finfish logbooks. The compliance plan for the net sector identifies failure to supply log book data as a low risk suggesting that there is generally good compliance with data provision by fishers. The SFA is also proactive in providing advice to fishers about best practice measures to address specific issues as they arise in the fishery and fishers are also supportive of research efforts including the provision of fish samples. For example, industry provided otoliths of Golden Perch to enhance the stock assessment with new age structure data.</p> <p>There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.</p>	
d	Guidepost		There is no evidence of systematic non-compliance.
	Met?		Y
	Justification	Compliance reports provide no indication of systematic non-compliance but point to low levels of non-compliance with low to high risk compliance issues. During 2012/13 fisheries officers issues 10 cautions and seven expiations in the commercial sector and four cautions and four expiations in the recreational sector. No charges were laid. Most cautions and expiations were related to the fishing gear used (PIRSA, 2013e).	
References	PIRSA, 2013b; PIRSA, 2013c; PIRSA, 2013d; PIRSA, 2013e; PIRSA, 2012d; PIRSA, 2012e; PIRSA, 2012f; PIRSA, 2012g; PIRSA, 2012h		
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 3.2.4

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
		Met?	Y	N

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
	Justification	<p>The Management Plan for the LCCC includes a Strategic Research and Monitoring Plan. It identifies a series of fishery-wide and species-specific research priorities. Under the existing Management Plan the Inland Fisheries Management Committee (IFMC) was to conduct an annual assessment of research priorities. However, the IFMC was disbanded upon implementation of the FMA 2007. Since that time it is unclear to what extent the Strategic Research and Monitoring Plan has been relied upon to guide research in the fishery. However it has been agreed that stock assessment for key species be carried out every five years and these stock assessments are a central means by which knowledge gaps and research needs are identified for target stocks.</p> <p>There is a written document specifying the research plan for the fishery. There is also a rolling program of 5 yearly stock assessments for key target stocks and ad hoc research into broader ecosystem impacts is conducted as the need is identified. Specific biological knowledge gaps for key species have been identified (anon, undated) and there is also evidence that the fishery is proactive in identifying research needs to address management needs. For example, the fishery has developed a research funding proposal to examine ways to foster autonomous adjustment in the net sector of the LCF. Research is clearly undertaken as required.</p> <p>However, these processes, even when taken together, do not constitute a strategic approach that is pro-active, anticipatory or designed to identify gaps in knowledge on all aspects of the fishery. As a result it cannot be concluded that the LCF has a research plan that is capable of providing the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.</p>		
b	Guidepost	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	Met?	Y	Y	N
	Justification	<p>Research is published on SARDI's website. In addition, any research funded by the Fisheries Research and Development Corporation is published on the FRDC website. SARDI presents the results of research to the Lakes and Coorong Consultative Committee which includes broader stakeholder groups.</p> <p>It can be concluded that research results are disseminated to all interested parties in a timely fashion. However, given the lack of an actively used research plan it is not possible to conclude that the plan is disseminated to all interested parties. Nor does simply placing a report on a website constitute making it widely and publicly available. Availability also requires knowledge of existence of the reports and currently there is no evidence that SARDI or PIRSA make any effort to publicize the availability of these reports.</p>		
References		Anon (undated). LCF current knowledge and knowledge gaps.		

PI 3.2.4	The fishery has a research plan that addresses the information needs of management	
OVERALL PERFORMANCE INDICATOR SCORE:		70
<p>CONDITION NUMBER (if relevant): 8</p> <p>By the second surveillance audit the client shall have developed a research plan that provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. The strategic approach adopted in the research plan should be pro-active, anticipatory and capable of identifying gaps in knowledge in advance of management needs.</p>		x

Evaluation Table for PI 3.2.5

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives		
		There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	Y	Y	N
	Justification	<p>The current management plan, incorporating the fishery-wide harvest strategy, provides for a five-year review. The current process to develop a new Management Plan effectively constitutes that review. The Pipi Harvest Strategy is subject to review after three years. Section 49 of the FMA 2007 requires that new Management Plans developed under the Act must be subject to review every five years and empowers the Fisheries Council to review a management plan at any time.</p> <p>Compliance risk assessments are reviewed annually and new compliance plans developed in response to those assessments.</p> <p>Currently there is no formal process to review research needs in the fishery. Similarly, while management changes are made in response to identified problems in the fishery this approach does not comprise an ongoing evaluation of the management system</p> <p>There are mechanisms in place to evaluate key, but not all, parts of the management system.</p>		
b	Guidepost	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Y	N	N

PI 3.2.5		<p>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives</p> <p>There is effective and timely review of the fishery-specific management system</p>
	Justification	<p>Internal review of the LCF management system occurs predominantly through the requirements for occasional review of the management plan and the harvest strategies. Research is subject to internal review within SARDI.</p> <p>There is no system of regular internal review of the performance of the management system against the objectives of the management plan. Occasional external review of some aspects of the management system occurs through the DEH assessments under the EPBC Act. These assessments address the effectiveness of the system in sustaining target and bycatch species and managing broader ecosystem impacts and interactions with ETP species. However, they do not review the research plan nor do they assess the effectiveness of the system in delivering against some of the objectives of the Management Plan e.g. optimum utilisation and equitable distribution of fisheries resources or cost-effective and participative governance of the fishery.</p> <p>There is no requirement in place for external peer review of research conducted for the LCF. However, the harvest strategy for Pipis has been externally reviewed.</p> <p>The fishery-specific management system is subject to occasional internal review and some aspects are subject to occasional external review. However not all aspects of the management system are subject to regular internal review or occasional external review.</p>
References		
OVERALL PERFORMANCE INDICATOR SCORE:		70
CONDITION NUMBER (if relevant): 9		
By the second surveillance audit the client shall ensure that the management system is subject to regular internal and occasional external review.		x

Appendix 1.2 Risk Based Framework (RBF) Outputs

Despite of initial discussion and announcements that was posted on the MSC website on February 5th 2013 to use the RBF for some of the Performance Indicators the RBF was not used for this assessment. During the onsite meeting the assessment team received additional documents and reports that indicated that the scoring and assessment could be conducted without using the RBF.

Appendix 1.3 Conditions

The fishery was certified with 30 conditions in 2008 (22 under Principle 1, 6 under Principle 2 and 2 under Principle 3). At the 3rd annual surveillance audit nine conditions were closed out and at the 4th annual surveillance audit 8 more conditions were closed by the surveillance team as a result of satisfactory achievement of the client's action plan leading to an outcome that would result in a score of 80 or more on the relevant indicator (see Table 4.2 for more details).

In total 13 conditions remain open after the 4th annual surveillance audit, 6 in Principle 1, 5 in Principle 2 and 2 in Principle 3 (Table 7). Three major and one minor non-conformance were addressed before the re-assessment of the fishery progressed. The 9 remaining conditions were carried over into the new assessment (see Table A1.3).

Table A1.3:

Condition 1

Performance Indicator	1.1.1 (Mulloway)
Score	70
Rationale	<p>The 2011 stock assessment concluded that that egg production of Mulloway may be compromised. Recruitment strength has been linked to river flow and there has been no recent monitoring to assess the level of recruitment of Mulloway associated with the recent period of higher river flows. Indicators show fluctuations but no overall trends. The uncertainties expressed in the most recent stock assessment report (Ferguson and Ward 2011) about the ability of the chosen fishery indicators to provide an accurate indication of stock status, and the lack of any monitoring of recruitment levels or age structure, mean that it is not highly likely that the stock is above the point where recruitment would be impaired.</p> <p>This meets the requirements for SG 60 but not the SG 80 levels.</p>
Condition	By the second surveillance audit provide evidence that it is highly likely that the stock is above the point where recruitment would be impaired.
Milestones	N/A
Client action plan	<ol style="list-style-type: none"> 1. Mulloway are due for a stock assessment report in 2013/14 (report due in May 2014), including catch sampling and otolith-based assessment of age structure of fished stocks. 2. The results of the T Barnes PhD identifying stock structure and

	population structure should further address the uncertainties in understanding the dynamics of the stock in southern Australia
Consultation on condition	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being delivered as part of the CLLMM programs; 4. The draft CAP was then provided to PIRSA and SARDI for comment and agreement, this included discussion at an inter departmental level with the Department for Environment, Water and Natural Resources; 5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR); 6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.

Condition 2a

Performance Indicator	1.2.2 - Mulloway
Score	<60
Rationale	<p>The existing harvest rules for Mulloway are generally understood and the possible ways that they <u>might</u> be amended to reduce the exploitation rate if limit reference points are <u>breached</u> are clearly outlined in the management plan. There is also evidence that management measures would be taken under such a scenario from the experience with Pipi where there was a major response to the breaching of its limit reference points. When the catch limit reference point for Mulloway was breached in 2009-10 and 2010-11, however, there was no remedial action because a new assessment and revisions to the management arrangements were planned.</p> <p>Nevertheless, the form of the harvest control rule does not act to keep the stock above the limit reference point, it does not reduce the exploitation rate as a limit reference point is approached, nor does it act to return the stock to target levels when below it.</p> <p>This does not meet the requirements of the SG 60 level.</p> <p>The potential harvest control rules for Mulloway have been deliberately left broad to reflect the inherently dynamic nature of a stock that has a dependency on an estuarine system with a naturally highly variable flow regime. The unpredictability of the system and hence of the level of future recruitment constitute one of the main uncertainties for Mulloway. The</p>

	<p>harvest control rules, however, do not explicitly take this uncertainty into account.</p> <p>This does not meet the requirements of the SG 80 level.</p>
Pre-Condition	By July 2014 submit a revised harvest control rule for Mulloway to the Fisheries Council that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.
Client action plan Pre-Condition	Funding has been secured from FRDC and industry that will support the development of a new management framework and harvest strategies for finfish species, in particular Mulloway. The draft final report for the project is due to be finalised in mid to late April 2014. The Fisheries Council is due to meet in early July 2014 to consider the harvest strategies in the draft management plan.
Condition 2b	By the second surveillance audit implement the harvest control rule for Mulloway that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.
Milestones	<p>May 2014 achievable score 60</p> <p>December 2015 achievable score 80</p>
Client action plan	<ol style="list-style-type: none"> 1. The Fishery Management plan incorporating the formal harvest control rules is scheduled to be completed by November 2014. 2. Implementation of the Plan will commence in 2015, once it has been approved by the Minister.
Consultation on condition	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being delivered as part of the CLLMM programs; 4. The draft CAP was then provided to PIRSA and SARDI for comment and agreement, this included discussion at an inter departmental level with the Department for Environment, Water and Natural Resources; 5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR); 6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.

Condition 3a

<p>Performance Indicator</p>	<p>1.2.2 – Golden Perch</p>
<p>Score</p>	<p><60</p>
<p>Rationale</p>	<p>The existing harvest rules for Golden Perch are generally understood and the possible ways that they <u>might</u> be amended to reduce the exploitation rate if limit reference points are <u>breached</u> are clearly outlined in the management plan. There is also evidence that management measures would be taken under such a scenario from the experience with Pipi where there was a major response to the breaching of its limit reference points. Nevertheless, they do not act to reduce exploitation rates as limit reference points are <u>approached</u>. The form of the harvest control rule does not act to keep the stock above the limit reference point nor does it act to return the stock to target levels when they are below it.</p> <p>This does not meet the requirements of the SG 60 level.</p> <p>The potential harvest control rules for Golden Perch have been deliberately left broad to reflect the inherently dynamic nature of a stock whose abundance is thought to be related to a naturally highly variable flow regime. The unpredictability of the system and hence of the level of future recruitment constitute one of the main uncertainties for Golden Perch. The harvest control rules, however, do not explicitly take this uncertainty into account.</p> <p>This does not meet the requirements of the SG 80 level.</p>
<p>Pre-Condition</p>	<p>By May 2014 submit a revised harvest control rule for Golden Perch y to the Fisheries Council that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.</p>
<p>Client action plan Pre-condition</p>	<p>Funding has been secured from FRDC and industry that will support the development of a new management framework and harvest strategies for finfish species, in particular Golden Perch. The draft final report for the project is due to be finalised in mid to late April 2014. The Fisheries Council is due to meet in early July 2014 to consider the harvest strategies in the draft management plan.</p>

Condition 3b

Condition 3b	By the second surveillance audit implement the harvest control rule for Golden Perch that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.
Milestones	May 2014 achievable score 60 September 2014 achievable score 70 December 2015 achievable score 80
Client action plan	<ol style="list-style-type: none"> 1. The Fishery Management plan incorporating the formal harvest control rules should be approved by August / September 2014. 2. Implementation of the Plan should be completed by June 2015
Consultation on condition	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being delivered as part of the CLLMM programs; 4. The draft CAP was then provided to PIRSA and SARDI for comment and agreement, this included discussion at an inter departmental level with the Department for Environment, Water and Natural Resources; 5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR); 6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.

Condition 4a

Performance Indicator	1.2.2 - Yellow-eye Mullet
Score	<60
Rationale	The existing harvest rules for Yellow-eye Mullet are generally understood and the possible ways that they <u>might</u> be amended to reduce the exploitation rate if limit reference points are <u>breached</u> are clearly outlined in the management plan. There is also evidence that management measures would be taken under such a scenario from the experience with Pipi where there was a major response to the breaching of its limit reference points. Nevertheless, they do not act to reduce exploitation rates as limit reference points are <u>approached</u> . The form of the harvest control rule does not act to

	<p>keep the stock above the limit reference point nor does it act to return the stock to target levels when they are below it.</p> <p>This does not meet the requirements of the SG 60 level.</p> <p>The potential harvest control rules for Yellow-eye Mullet have been deliberately left broad to reflect the inherently dynamic nature of a stock whose abundance is thought to be related to a naturally highly variable flow regime. The unpredictability of the system and hence of the level of future recruitment constitute one of the main uncertainties for Golden Perch. The harvest control rules, however, do not explicitly take this uncertainty into account.</p> <p>This does not meet the requirements of the SG 80 level.</p>
Pre-Condition	By May 2014 submit a revised harvest control rule for Yellow-eye Mullet to the Fisheries Council that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.
Client action plan Pre-condition	Funding has been secured from FRDC and industry that will support the development of a new management framework and harvest strategies for finfish species, in particular Yelloweye Mullet. The draft final report for the project is due to be finalised in mid to late April 2014. The Fisheries Council is due to meet in early July 2014 to consider the harvest strategies in the draft management plan.

Condition 4 b

Condition 4 b	By the second surveillance audit implement the harvest control rule for Yellow-eye Mullet that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it.
Milestones	<p>May 2014 achievable score 60</p> <p>September 2014 achievable score 70</p> <p>December 2015 achievable score 80</p>
Client action plan	<ol style="list-style-type: none"> 1. The Fishery Management plan incorporating the formal harvest control rules is scheduled to be completed by November 2014. 2. Implementation of the Plan will commence in 2015, once it has been approved by the Minister.
Consultation on condition	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being delivered as part of the CLLMM programs; 4. The draft CAP was then provided to PIRSA and SARDI for comment and agreement, this included discussion at an inter departmental

	<p>level with the Department for Environment, Water and Natural Resources;</p> <p>5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR);</p> <p>6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.</p>
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Condition 5

Performance Indicator	2.2.3
Score	75
Rationale	The data on bycatch is derived from a single study of the fishery, supported by fishery-dependent logbook records. There is no current ongoing program of independent observation of bycatch across the fishery, or system of synthesis and reporting that might be capable of detecting and triggering response action in the event of an increase in risk to bycatch species (either all or 'main', as defined by MSC).
Condition	By the second surveillance audit provide evidence to the CAB that an ongoing fishery independent bycatch observation/ reporting program, to detect any increase in risk to bycatch species has been implemented, of a design suitable for the scale of the fishery.
Milestones	N/A
Client action plan	<ol style="list-style-type: none"> 1. Independent monitoring arrangements for fishing in the Lakes and the Coorong are being finalised and should be in place before June 2014 2. Funding to support this monitoring program has been agreed for the 2014/15 licensing year onwards 3. Bycatch PI will be developed as part of the LCF harvest strategy, based on data in the FRDC Project 2005/061 Report: "Gear interaction of non-targeted species in the lakes and Coorong commercial and recreational fisheries of South Australia" (Ferguson 2010).
Consultation on condition	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being delivered as part of the CLLMM programs; 4. The draft CAP was then provided to PIRSA and SARDI for comment

	<p>and agreement, this included discussion at an inter departmental level with the Department for Environment, Water and Natural Resources;</p> <p>5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR);</p> <p>6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.</p>
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Condition 6

Performance Indicator	2.5.3
Score	75
Rationale	<p>The fishery has the potential to impact 10 of the ecosystem indicators, and while limited levels of impact can be inferred (consistent with the SG60), none of these potential impacts have been studied in detail in relation to the ecosystem condition, including resilience in the long term of targeted fish populations and their linkages to other aspects of the structure and function of the ecosystem.</p> <p>Sufficient data are collected on catch and effort for the targeted and retained species, and on the operation of the measures in the fishery, to meet SG80. However, there is very little data collected to inform an increase in risk flowing from a reduction in effectiveness of the catch measures designed to protect the ecosystem, and specifically the effectiveness of the reference points to maintain/enhance population structure across the range of retained/target species to meet concerns about a lack of resilience in populations of Mulloway, Black Bream and Greenback Flounder that may be constrained by the fishery operations (as expressed in Ferguson et al., 2013: constrained population structure and reduced species richness). These two issues are related - reduced abundance of larger/older individuals affects estimates of species richness, and the main ecosystem-level concern is the ongoing trend of fishery catches comprising increasingly of opportunist species with short life-spans and rapid reproduction, replacing species with longer life spans and lower rates of reproduction. The lack of data about the impacts of such changes in the ecosystem is also possibly confounded with the lack of knowledge about the catch patterns in the recreational fishery. Overall, sufficient data is not collected to detect an increase in the level of risk (in a timely manner) related to the effectiveness of the existing fishery management measures, so not achieving the SG80.</p>
Condition	By the first surveillance audit the client shall provide evidence to the CAB that a study on the main impacts of the fishery on key ecosystem elements

	<p>has been developed. These should include an assessment of the ecological role of the truncated population structure in the trophic relationships of Black Bream and Greenback Flounder in the Coorong.</p> <p>By the second surveillance audit evidence shall be provided to the CAB that funding has been secured and the work program has been commenced.</p> <p>By the third surveillance audit provide evidence that the work has been conducted.</p> <p>By the fourth surveillance audit a report shall be submitted to the CAB including an assessment of the findings and a plan (including resourcing) for continuing monitoring of potential impacts.</p>
Milestones	N/A
Client action plan	<ol style="list-style-type: none"> 1. There is currently limited information of the ecological role of the truncated population structure in the trophic relationships of Black Bream and Greenback Flounder. SARDI is currently undertaking a desktop review (as part of the DEWNR CLLMM program) of all the research undertaken on trophic relationships with a focus on fish species during the drought in the Coorong region. Additional diet study will be conducted under the current flow conditions for Mulloway, Congolli and Australia salmon. This will be done in conjunction with an honors student project, Flinders University (supervised by Associate Professors Qifeng Ye and Sabine Dittmann). Data obtained in the proposed study and data available from other recent (post-drought) studies will be used to develop conceptual understanding of the current food web in the Coorong and investigate the potential shifts in trophic structure between the drought and freshwater flows. 2. The results of Jason Earl's PhD identifying population structure of Greenback Flounder and the factors influencing population abundance and structure, including fish movement, exploitation, river flows and its trophic relationships, should further address the uncertainties in understanding the dynamics of the population in the Coorong. 3. Although not directly addressing the questions in 6a, fish condition monitoring for the Living Murray has been implemented since 2008/09 in the Coorong. Key species include Black Bream and Greenback Flounder. Information presented includes population abundance, age/size structures and recruitment. Annual reports are available on SARDI website. 4. Black Bream and Flounder are due for a stock assessment report in 2014/15 (report due 31 May 2015), including catch sampling and otolith-based assessment of age structure of fished stocks. 5. A multispecies stock assessment is due for assessment in 2015/16 (report due 31 May 2016), which will assess the impacts of the drought, flow regime and fishing on the assemblage in the Lakes and Coorong Fishery.
Consultation on condition	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being

	<p>delivered as part of the CLLMM programs;</p> <ol style="list-style-type: none"> 4. The draft CAP was then provided to PIRSA and SARDI for comment and agreement, this included discussion at an inter departmental level with the Department for Environment, Water and Natural Resources; 5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR); 6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.
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Condition 7

Performance Indicator	3.2.2
Score	75
Rationale	<p>While there is a considerable amount of publicly available information on the fishery, there is no centralized site for accessing this information. This does not facilitate stakeholder understanding of the fishery, its management or its performance. Further there are a number of significant gaps in the public availability of information. For example, the Pipi Harvest strategy, while available to industry participants in the consultation process, is not available on either the PIRSA or SARDI websites. Further, as noted earlier, there is a lack of publicly available information on the rationale for management decisions taken in the fishery.</p> <p>Some information on fishery performance and management action is generally available on request to stakeholders. However, there is a general absence explanation for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review.</p>
Condition	By the first surveillance audit the client shall demonstrate that processes are in place to ensure that explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
Milestones	N/A
Client action plan	The Fishery Management Pan under development (2014schedule to be completed by November 2014) will provide a specific set of performance

	<p>and monitoring standards and indicators to be met.</p> <p>A committee dedicated to overseeing management issues relevant to the LCF will be formed following implementation of the Management Plan, this will provide a forum to evaluate advice and ensure that explanations are provided for management responses to research monitoring, evaluation and review. The management Plan will be available on the PIRSA website.</p>
Consultation on condition	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being delivered as part of the CLLMM programs; 4. The draft CAP was then provided to PIRSA and SARDI for comment and agreement, this included discussion at an inter departmental level with the Department for Environment, Water and Natural Resources; 5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR); 6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.

Condition 8

Performance Indicator	3.2.4
Score	70
Rationale	<p>The fishery does not have a strategic approach that is pro-active, anticipatory or designed to identify gaps in knowledge on all aspects of the fishery. As a result it cannot be concluded that the LCF has a research plan that is capable of providing the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.</p>
Condition	<p>By the second surveillance audit the client shall have developed a research plan that provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. The strategic approach adopted in the research plan should be pro-active, anticipatory and capable of identifying gaps in knowledge in advance of management needs.</p>
Milestones	N/A

Client action plan	The research plan in the Fishery Management Plan (schedule to be completed by November 2014) will be developed to comply with this condition, appropriate to the scale of the fishery.
Consultation on condition	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being delivered as part of the CLLMM programs; 4. The draft CAP was then provided to PIRSA and SARDI for comment and agreement, this included discussion at an inter departmental level with the Department for Environment, Water and Natural Resources; 5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR); 6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.

Condition 9

Performance Indicator	3.2.5
Score	70
Rationale	The fishery-specific management system is subject to occasional internal review and some aspects are subject to occasional external review. However not all aspects of the management system are subject to regular internal review or occasional external review.
Condition	By the second surveillance audit the client shall ensure that the management system is subject to regular internal and occasional external review.
Milestones	N/A
Client action plan	<ol style="list-style-type: none"> 1. The draft harvest strategy for the fishery will be independently reviewed before the management plan is finalised. 2. The effectiveness of the new management regime to be established under the Fishery Management Plan (schedule to be completed by November 2014) will be subject to review under the new Fishery Management Plan. The Fisheries Management Act 2007 requires that

	<p>the Fisheries Council conduct a full review of the management plan as soon as practicable after the fifth year of commencement of the management plan.</p> <p>3. The research assessment process is to be subject regular external review.</p>
<p>Consultation on condition</p>	<ol style="list-style-type: none"> 1. Meeting of the SFA executive; 2. Meetings with PIRSA as part of the process of the client review of the draft assessment; 3. A request to SARDI for advice on the projects and programs being delivered as part of the CLLMM programs; 4. The draft CAP was then provided to PIRSA and SARDI for comment and agreement, this included discussion at an inter departmental level with the Department for Environment, Water and Natural Resources; 5. A further revision was presented to the Lakes & Coorong Management Plan Steering Committee and was endorsement at its meeting on 6 March 2014 (involving members of SARDI, PIRSA and DEWNR); 6. The CAP was then provided to PIRSA Fisheries & Aquaculture Executive for their endorsement.

Appendix 2. Peer Review Reports

Peer Reviewers Overall Opinion

Overall Opinion of the Report		
	Peer Reviewer 1	Peer Reviewer 2
Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report? (Yes/No)	Yes	Yes
Peer Reviewer Justification	<p>In general, I agree with the scoring of each of the individual issues for each performance indicator (PI) within Principles 1, 2, and 3. The assessment team provides adequate justification for their scores. In a limited number of cases I have questioned the average score given to a PI, but that is more a question of the averaging scheme, not a particular issue score.</p>	<p>The comments and scores seemed accurate and defensible although some comments were made in a few areas.</p> <p>The only significant area was in relation to the process of selecting reference points, which has shortcomings in each of the species. In the case of Pipis, the LRP approximates the lowest density estimate at a time when the stock was depleted. This LRP seems to have been selected through an arbitrary process. The density appears high ($\sim 1\text{kg/m}^2$) and is probably reasonable, but the problem for this scoring process is that the logic and process of defining the LRP isn't clear. The TRP is of more concern for scoring of the assessment because the value has not been justified. There is a well-developed harvest strategy to move the stock towards the TRP, but it's not clear whether this TRP is consistent with Bmsy (or any other objective for the fishery).</p> <p>In the case of the scalefish, a generic approach was used to set RPs based on historic fishery dependent catch data. This process results in wider spaced RPs and a lower LRP from data series where there is more variation and less</p>

		<p>certainty. That is, the LRP will be less conservative for species: (i) from variable environments; (ii) with variable catch rates; or (iii) with noisy catch data (ie Mulloway and Golden Perch). It is these species where an effective LRP is needed most yet the approach used to define the RPs shifts the LRP lower than would occur if there were more stable catch data. These RPs are critical for an effective HS so this issue requires careful review.</p>
Certification Body Response		
Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? (Yes/No)	Yes	No, some minor suggestions.
Peer Reviewer Justification	<p>Three pre-condition and the nine conditions cover current inadequacies in the fishery in terms of meeting MSC sustainability certification, and when those conditions are met, the fishery should be able to meet the SG 80 level for the relevant PIs.</p>	<p>For PI 1.1.2. No condition at present although there appears to be a need to analyse the RPs and possibly modify these to levels that are justified through that process.</p> <p>For 2.5.3. Condition 6 should include a requirement to plan for ongoing data collection, as this PI requires continued monitoring.</p> <p>For 3.2.4. This condition would ideally include demonstrating a process to review and update the research plan. Perhaps as part of the proposed management plan review cycle.</p>
Certification Body Response	<p>Peer reviewer 1: no response required</p> <p>Peer reviewer 2: PI 1.1.2</p>	

	<p>PI 2.5.3 Agreed; Condition 6 has been amended require “a plan for continuing monitoring” to be submitted at the 4th surveillance audit.</p> <p>PI 3.2.4 With respect to the suggestion to include a requirement to regularly update the research plan, it is noted that this is not an explicit requirement of the performance indicator. However it is considered that the need for updating is implicit in the condition’s requirements for a plan that takes a strategic approach provides timely information and that is proactive and anticipatory. No changes were made to the report.</p>
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Client Action Plan Comments

Client Action Plan Comments (if included)		
	Peer Reviewer 1	Peer Reviewer 2
Do you think the client action plan is sufficient to close the conditions raised? (Y/N)	Yes	No in relation to Condition 1. Minor suggestions on others below.
Peer Reviewer Justification	A detailed client action is described in the assessment report that indicates that the fishery has adopted an appropriate response and schedule to meet the requirements of the pre-conditions and the conditions, so as to close out all the conditions by the end of the new 5 year certification period.	Condition 1 (and also Condition 2a) relates to the need to have an effective harvest strategy. Part of this involves development of reference points for mullock that are highly likely to prevent recruitment overfishing. The current limit reference point is set low to avoid being triggered by the dynamic system but this doesn’t place adequate weighting on the need to protect recruitment. This need to review the reference points (especially limit) is included in the rationale for the condition but is not explicit in the action plan. Condition 3b should ideally have explicit mention of the need for review of the limit reference point. This has been set at a very low level for golden perch by a generic process and is critical for the

		functioning of the harvest strategy. Condition 8 should make mention of periodic revision of the research plan, perhaps as part of the management cycle (Condition 9), as this is part of the requirement of 3.2.4.
Certification Body Response	Peer Reviewer 1: No response required Peer Reviewer 2: NEED RESPONSE NOW	

Peer Reviewers General Comments

Peer Reviewer General Comments (optional)	
Peer Reviewer 1	Peer Reviewer 2
The Lakes and Coorong Fishery is a small fishery (36 license holders), that appears to be reasonably well managed. Considering the number of conditions placed on the fishery in the initial certification (30), the fact that there are three pre-conditions, and nine conditions proposed in the current re-assessment indicates the progress this fishery has made in the last five years toward meeting MSC sustainability standards.	
Certifying Body Response	
No response required.	

Peer Reviewers Comments Related to Scores and Rationales

Principle 1

Performance Indicator 1.1.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	No.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	Yes	Yes.
Peer Reviewer Justification	This PI addresses the question: Is the stock is at a level which maintains high productivity and has a low probability of recruitment overfishing? Four species are covered under P1 PIs:	Regarding relevant information: A report on the pipi fishery was produced in 2013 (Ferguson, 2013 –SARDI 731) and was not listed in references. That report was published after this

	<p>pipi, mulloway, golden perch, and yellow-eye mullet. The report presents the results of fishery independent surveys for pipi, and fishery dependent catch and CPUE data for mulloway, golden perch, and yellow-eye mullet. These data are the basis for the stock status assessment and the defined target and limit reference points. Therefore it appears that all the relevant information has been used to score this PI.</p> <p>The PI scores for pipi, mulloway golden perch, and yellow-eye mullet are 90, 70, 90 and 100, respectively. Pipi, golden perch, and yellow eyed-mullet meet the A issue at the SG 60, 80 and 100 levels, but mulloway only meets the SG 60 level for this issue. All four species meet the B issue at the SG 80 level, and only yellow-eye mullet meets the B issue at the SG 100 level. Therefore the scores are appropriate.</p> <p>Condition 1 requires that by the second surveillance the fishery provide evidence that the mulloway stock is above a point where recruitment would be impaired .</p>	<p>assessment, which explains the omission, and conclusions aren't affected. The assessment team did not seem to consider size limits in respect to maturity and thus the resilience that this regulation may or may not provide to the objective of preventing recruitment overfishing. Size limits are less effective for PI 1.1.1 in mulloway. Condition 1 deals with the need to provide greater certainty around prevention of recruitment overfishing in mulloway. This is where some mention of size limits and onset of maturity in scoring would be helpful as size limits are possibly part of this solution.</p> <p>Regarding scoring rationale: Scores in relation to recruitment overfishing are solid. There's more ambiguity around whether the stocks are at levels maintaining high productivity. This is heavily reliant on the appropriateness of reference points, which are considered separately in PI 1.1.2. The process for defining reference points in these fisheries is weak and thus it's not clear whether exceeding TRPs is good evidence that productivity is being maintained at high levels. This is of greatest concern for pipis (because of their larger catch and indications of harvest rates) and mulloway (because basic controls like legal minimum length provide less protection than for other species).</p>
<p>Certification Body Response</p>	<p>Peer review 1 comments: No response required.</p> <p>Peer review 2 comments: As the reviewer notes, the 2013 stock assessment report on Pipi was produced after the assessment. Its findings will be considered during surveillance audits.</p>	

	<p>It is agreed that size limits relative to the size at maturity are potentially relevant to the objective of preventing recruitment overfishing and this was considered by the assessment team. To make this consideration clearer additional text has been added to the background information and to the scoring rationales for Pipi.</p> <p>For Mulloway it is already noted (page 23) that the current size limit is unlikely to provide protection against recruitment overfishing. This is, however, only one of the reasons that the 2011 assessment and the assessment team concluded that egg production of Mulloway may be compromised. For clarity, all these reasons have now been repeated in the scoring rationale.</p> <p>The current (albeit limited) knowledge about size at maturity for South Australian populations of Golden perch is described in the body of the report. For Golden perch the size limit relative to the size at maturity is one reason why they had been considered to be potentially vulnerable to over-exploitation but direct fishery-independent data on high recruitment levels after a prolonged drought has been used to conclude that there is a high degree of certainty that the South Australian population is above the point where recruitment would be impaired.</p> <p>These amendments have not affected the assigned scores.</p> <p>Concern as to whether the TRPs maintain stocks at high productivity levels are addressed under PI 1.1.2.</p>
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Performance Indicator 1.1.2		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes	No.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A – comment below.
Peer Reviewer Justification	This PI addresses the question: Are the target and limit reference points appropriate for the stock? The target and limit	Regarding scoring rationale: Pipis: SG80 appears appropriate rather than SG100. There has been substantial effort on revising the harvest strategy and

	<p>reference points for all four stocks are defined, and can be estimated. For pipi they are based on fishery independent survey data, while for the other three stocks they are generic, and appropriate for the scale and intensity of fishing. Therefore it appears that all the relevant information has been used to score this PI.</p> <p>The PI scores for pipi, mulloway golden perch, and yellow-eye mullet are 100, 80, 80, and 80, respectively. Pipi, mulloway, golden perch, and yellow eyed-mullet meet the A issue at the SG 60 and 80 levels. For issue B, all for species meet the SG 80 level, but only pipi meets the SG 100 level for this issue. For issue C, all four species meet the SG 80 level, and only pipi meets the SG 100 level. Therefore all the scores are appropriate.</p> <p>There are no conditions on this PI</p>	<p>management plan for pipis. Reference points are now based on independent estimates of density and combined with a decision rule structure for TAC. However the critical aspect for scoring of PI 1.1.2 is whether the TRP and LRP values are appropriate and this is not clear.</p> <p>The claim that maintaining density above a limit of 4 kg / 4.5 m² prevents risk of recruitment overfishing isn't explained or justified (including in Ferguson 2013). This appears to be a safely high density (approximates 1 kg pipis / m²) but it's difficult to conclude that this <i>"limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues"</i>. This is because this density has been observed only once and that was in the year of lowest CPUE. SARDI characterized the fishery as overfished at this point. There is no information to compare this density against common benchmarks for LRPs such as 30% of the unfished stock.</p> <p>The claim that the target level of 10 kg / 4.5 m² will allow the fishery to be exploited at historically sustainable levels (Pipi Harvest Strategy) or maintain the stock <i>"at a level consistent with BMSY or some measure or surrogate with similar intent or outcome"</i> (1.1.2c) may be correct but the logic or analysis for this level isn't apparent, thus SG100 is not appropriate. Sustainable harvesting shouldn't be the point of TRPs in any case - this is the role of the LRP. The density was above this TRP in 2009/10, a year when catch rates were near record lows (5 or 6th lowest since 1984 depending on CPUE method). This low catch</p>
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	<p>rate follows only one year after a period characterized by SARDI as not having conservative TACCs. The point here is that there's no information to show how TRP can be considered to approximate Bmsy.</p> <p>A suggestion on how to improve the basis for the RPs is through an empirical process. The creation of small and temporary no-fish areas could be used to compare density of pipi biomass with fished sites (acknowledging this doesn't resolve recruitment effects). This would provide some scale to the RPs.</p> <p>Mulloway: SG60 rather than SG80 appears appropriate. The latest stock assessment from SARDI states <i>"the upper and lower catch trend and CPUE trend reference points are widely separated and therefore do not provide informative criteria for the accurate assessment of the species (Ferguson and Ward, 2011)."</i> Therefore it does not seem appropriate to score these SG80 <i>"..appropriate for the stock"</i>. The RPs for CPUE also cover a huge span of around 6x to 10x depending on gear. This is understandable given the generic method used to define RPs, the small tonnage, and the highly variable environment but it's difficult to have confidence that <i>"the limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity."</i> Current stock appears far above these LRPs with CPUE for the main gear 10x the LRP, which is positive, but it's uncertain the LRPs will provide protection if required.</p> <p>Golden Perch: SG60 rather than SG80 appears appropriate. As per mulloway, the LRP is very low (eg 2kg / fisher day) as a result of the</p>
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	<p>generic process used to define RPs. It does not seem appropriate to score these SG80 “<i>..appropriate for the stock</i>” because the effectiveness or otherwise of the LRP can’t be assessed. The latest assessment report also notes that “<i>the continued reliance on fishery-dependent catch and effort data for the index of abundance</i>” contributes to uncertainty on status relative to the RPs.</p> <p>Mullet: SG80 appears appropriate for this species. CPUE and catch are less variable so that the LRP is not set close to zero as per mulloway and golden perch so it appears more likely to be effective.</p> <p>Regarding condition: No conditions were specified as scores were at 80 or more. If these were lowered as proposed above, the challenge is to demonstrate that the LRP is set above the level at which there is an appreciable risk of impairing reproductive capacity. This isn’t required for pipis because they still meet SG80, however the HS could still be improved by demonstrating the proportion of unfished biomass that the LRP and TRP approximates with density surveys in unfished sites. These sites need only control pipi fishing and do not need to be permanent because of the lifespan of pipis. More consideration of the LRPs in mulloway and golden perch are required to find defensible LRPs that are not close to zero. This problem exists currently because of the generic approach involving historical ranges, in a highly dynamic system. The need here is to demonstrate that LRPs will actually cut-in when required during periods of low abundance. It would be possible and helpful to show probability of the stock</p>
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	<p>encountering LRPs based on historical patterns in fishery data, which has included years of extreme environmental situations.</p>
<p>Certification Body Response</p>	<p>Peer review 1 comments: No response required.</p> <p>Peer review 2 comments: Pipi: The reviewer suggests that a score of 80 is more appropriate than the assigned score of 100 and indicates that more justification is needed to show that the reference points are appropriate (scoring issue <i>a</i>), that the LRP is set above the level at which there is an appreciable risk of impairing reproductive capacity (scoring issue <i>b</i>), and that the TRP is at a level that is consistent with BMSY (scoring issue <i>c</i>).</p> <p>If scoring issue <i>a</i> is not met, however, as the review argues, the suggested score of 80 could not be achieved.</p> <p>Additional text has been added to the body of the report and to the scoring rationale to provide more information on the basis for the reference points and on expected recruitment levels and to better explain how the choice of target reference point is considered to have a similar outcome to a BMSY-based target reference point.</p> <p>The additional criteria needed to score 100 are that relevant precautionary issues have been taken into account in setting the reference points and with a high degree of certainty for the TRP. Such a score is also aided If the TRP is set at a level that is higher than one that is consistent with BMSY.</p> <p>We consider that the LRP for Pipi has been set at a level that takes precautionary issues into account and that the SG 100 level has been achieved for scoring issue <i>b</i>. Additional text has been added to the scoring rationale to support this argument.</p> <p>Having considered the reviewer’s comments we agree that, given that the TRP for Pipi has not been analytically determined and is based on a relatively short time series of fishery-independent data, there is not a high degree of certainty that the TRP for Pipi has been set at an appropriate level. This would therefore not meet the SG 100 level for scoring issue <i>c</i>. The score for Pipi for PI 1.1.2 has therefore been reduced from 100 to 90 (one of two scoring issues having been met).</p> <p>Mulloway: The reviewer has argued that the reference points are not appropriate for the stock. This is based on the comment in the assessment report that because the LRP and TRP are widely spaced they “do not provide informative criteria for the accurate assessment of the species”. We agree that the catch trend and CPUE indicators may fluctuate substantially</p>

	<p>for the reasons the reviewer outlines and that this produces widely spaced reference points but still contend that this does not make the reference points inappropriate, especially given the scale and intensity of the fishery. Thus we still contend that the SG 80 level of scoring issue <i>a</i> is met.</p> <p>The strong recovery of the Mulloway stock following an unprecedented drought provides good evidence that harvest strategy maintained the stock above a level at which recruitment has been impaired. Thus the SG 80 level of scoring issue <i>b</i> is also still considered to have been met.</p> <p>The reviewer does not specifically challenge the score assigned for scoring issue <i>c</i>, concerning the TRP, and given that the TRP is well above the LRP we remain of the view that the SG 80 level of this scoring issue has been met.</p> <p>Golden perch: The reviewer has similar concerns as for Mulloway, and our response is similar. Additionally, the reviewer has particular concerns “because the effectiveness or otherwise of the LRP can’t be assessed”. As for Mulloway, however, the effectiveness of the LRP for Golden perch has been tested empirically by the recent drought conditions and its effectiveness demonstrated by the strong subsequent recruitment. We remain of the view that the SG 80 level of this scoring issue has been met.</p> <p>Yellow-eye mullet: No response required.</p> <p>Regarding conditions: The reviewer provides useful suggestions about ways that the Harvest Strategy for Pipis could be improved. He expresses concern about whether LRPs for Mulloway and Golden perch “will actually cut-in when required during periods of low abundance”. This is relevant to the nature of the harvest control rules and is more appropriately addressed under PI 1.2.2 where a score of less than 60 was assigned and which the reviewer supports.</p>
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Performance Indicator 1.1.3		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	NA	Yes.
Will the condition(s) raised improve the fishery’s performance to the SG80 level? (yes/no/NA)	NA.	N/A.
Peer Reviewer Justification	This PI addresses the question	

	<p>of evidence of stock rebuilding for depleted stocks. None of the four stock in the Lakes and Coorong Fishery are depleted, and in need of rebuilding.</p> <p>There are no conditions for this PI.</p>	
Certification Body Response	No response required	

Performance Indicator 1.2.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	es.	es.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question of a robust and precautionary harvest strategy being in place. For the fours species that are covered by MSC certification in the Lakes and Coorong Fishery, the harvest strategy is designed to achieve the stock management objectives that are reflected in the target and limit reference points. The selected reference points that define the acceptable range of each indicator are very widely spaced. This has been a deliberate strategy that attempts to reflect the highly dynamic nature of the Lakes and Coorong Fishery. Therefore it appears that all the relevant information has been used to score this PI.</p> <p>All four species earned scores of 90 for this PI. For issue A, all four species met the SG 60, 80 and 100 levels. For issue B, all for species met the SG 60 and</p>	<p>Regarding scoring rationale:</p> <p>here are weaknesses in the performance of the LCF on this criteria. Given this, the final scores seem high. As noted for 1.1.2, the link between the stock management objectives and the LRP and TRPs are not justified (ie how do we have confidence the LRP is protecting recruitment and the TRP approximates optimal community benefit).</p> <p>For 1.2.1a The panel suggests that having wide ranges for each indicator is a good strategy for this dynamic system. The problem with this logic is that the wide range results in very low LRPs to the point where it's unclear if they could prevent fishery</p>

	<p>80 levels, and none met the SG 100 level. All for species met issue C at the SG 60 level, and issue D at the SG 100 level. Therefore the scores are appropriate.</p> <p>There are no conditions for this PI.</p>	<p>impacts on recruitment, should this be required in the future.</p>
Certification Body Response	<p>Reviewer 1: No response required</p> <p>Reviewer 2: The reviewer suggests that scores appear high but does not indicate specifically which scoring issues for which species he believes have been incorrectly scored. Nevertheless, we have reviewed the scores and rationales and consider them to be correct.</p> <p>The concerns expressed about whether the RPs have been set at an appropriate level have been considered above under PI 1.1.2 and the score for Pipi has been reduced. No additional response is required under this PI.</p>	

Performance Indicator 1.2.2		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes	Yes.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	<u>Yes</u>	Yes.
Peer Reviewer Justification	<p>This PI addresses the question of whether or not there is a well defined and effective harvest control rule in place. The proposed harvest control rules for pipi are clearly articulated in the harvest strategy, consistent with it, and would act to reduce the exploitation rate as the limit reference point was approached. In contrast for mulloway, golden perch, and yellow-eyed mullet, the form of the harvest control rule does not act to keep the stock above the limit reference point, it does</p>	<p>Regarding scoring rationale:</p> <p>The responsiveness of the HS to the stock is only clear in pipis where there is a decision rule process. For the other species the resultant action is undefined.</p> <p>A concern for pipis is the level of effectiveness in responding as the LRP is <u>approached</u> (critical for this PI), although it definitively shuts the fishery at density below 4 kg / 4.5 m². There are secondary measures in</p>

	<p>not reduce the exploitation rate as a limit reference point is approached, nor does it act to return the stock to target levels when below it. All this information is available, and has been used to score this PI.</p> <p>Pipi was given a final score of 90 for this PI, while the other three species all were less than 60. For issue A, only pipi met the SG 60 and 80 levels, while mulloway, golden perch and yellow-eyed mullet, did not even meet the SG 60 level. With regard to issue B, pipi met the SG 80 level, but not the SG 100, and the other species did not meet any to the SGs. For issue c, all four species met the SG 60 and 80 levels. Therefore the scores of mentioned above are appropriate and conditions are required for mulloway, golden perch, and yellow-eyed mullet.</p> <p>Pre-conditions (2a-4a) were issued for mulloway, golden perch and yellow-eyed mullet for those species to be included in the MSC certificate for the Lakes and Cooring fishery. That condition states that by May 2014, the fishery submit a revised harvest control rule for these species to the Fisheries Council that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it. Additionally,</p>	<p>the HS under development to deal with recruitment, which is commendable, but the bin width around the LRP seems wide and there may be a risk of high catches for too long when density and recruitment are low. There are only three density categories between the limit and the target. The TACC can be maintained at 450 t, far higher than current, when densities are below the soft limit of 8 kg or the target of 10 kg.</p>
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	<p>conditions (2b-4b) were issued for these species, by the second surveillance audit implement the harvest control rule for these species that would keep the stock above the limit reference point, reduce the exploitation rate as the limit reference point is approached, and return the stock to target levels when below it. When the fishery closes these conditions, the fishery can be re-scored to 80 for this PI.</p>	
Certification Body Response	<p>Reviewer 1: No response required</p> <p>Reviewer 2: Pipi: The harvest strategy uses categories for both TACCs and stock density with minimum 50 t changes in the TACC and 2 kg/4.5 m2 bin widths for density.</p> <p>The concern expressed by Reviewer 2 is that the TACC may remain at 450 t when the stock density is below target levels, that this level is too high and that this problem is related to the width of the categories used for stock density and TACC changes. The use of continuous rather than step functions to describe the boundaries between the different regions in the Decision Table would allow for finer scale adjustments to TACCs in response to density changes. The main issue, however, is whether the current form of the harvest control rules (which also include information on recruitment) would respond quickly enough to changes in density and recruitment move the stock to target levels and avoid it breaching the limit reference point.</p> <p>Our view is that the harvest control rules would not allow this to occur but a more definitive answer would require formal testing of the rule with a Management Strategy Evaluation type of analysis. The lack of such testing is now also noted in the text and is the reason that Pipi do not meet the SG 100 level of scoring issue <i>b</i> in PI 1.2.1. It is also noted that the harvest control rule does not explicitly take into account the main uncertainties, which include the variability in recruitment and rapid changes in stock density. This is the reason that Pipi do not meet the SG 100 level of scoring issue <i>b</i> in PI 1.2.2. Thus, the concerns of the reviewer have been factored into the current scores and the reviewer does not suggest a change to the existing scores.</p>	

Performance Indicator 1.2.3		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant	Yes.	Yes.

information available been used to score this indicator? (yes/no)		
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question of relevant information being collected to support the harvest strategy. The report</p> <p>describes the various fishery dependent and fishery independent data collection programs in place that provide information of the fishery and the resources. Therefore, it is clear that the assessment team considered all the data available to score the fishery.</p> <p>For issue A, all four species met the SG 60 and 80 levels, and only yellow-eyed mullet did not met the SG 100 level. For issue B, all four species met the SG 60 and 80 levels. For issue c, all four species met the SG 80 level. Therefore the overall PI scores of 90, 90, 90, 80 for pipi, mulloway, golden perch, and yellow-eyed mullet are appropriate.</p> <p>There are no conditions are required.</p>	

Certification Body Response	No response required
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Performance Indicator 1.2.4		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question: is there an adequate assessment of the stock. The draft MSC assessment report describes stock assessments for each species, and they are adequate for the stock and the harvest strategy. Therefore all the appropriate information has been used by the assessment team to score the fishery.</p> <p>For issue A, all four species met the SG 80 level, but only pipi met the SG 100 level. For issue B, all four species met the SG 60 level. For issue C, all four species met the SG 60 and 80 levels, not the SG 100 level. For issue D, none of the four species met the SG 100 level. For issue E, all four species met the SG 80 level, but only mulloway meets the SG 100 level. Therefore the assessment team overall scores of 85, 85, 80, and 80 for pipi, mulloway, golden perch, and yellow-eyed mullet, respectively, are</p>	<p>Regarding scoring rationale: An issue with this PI is that the appropriateness of the assessment is in reference to the harvest strategy, which was structured around the assessment information available. It is thus a circular process. Lower scores were appropriately applied to the scalefish species. The largest uncertainty in these fisheries that was not articulated is that there's no measure of fishing mortality included in the assessment. Exploitation rate is loosely inferred from trends in catch rate (or density in the case of pipi) but this is confounded with recruitment. The best guide to exploitation rate in scalefish is the occasional data on age structure, which has been used to make general comments on depletion. The absence of estimation of fishing mortality (or a useful proxy) in the assessment will be difficult to resolve for these small fisheries. It means that there will be uncertainty around whether changes in indicators of abundance are caused by the fishery or the dynamic environment. There are standard approaches to</p>

	<p>appropriate. (note that there is an inconsistency in the reported scores in Table 6.2 in the report)</p> <p>There are no conditions on this fishery for this PI.</p>	<p>resolving this (such as otolith sampling programs) but rarely applied in fisheries of this scale.</p>
<p>Certification Body Response</p>	<p>Peer reviewer 1: The inconsistency between the scoring rationale and summary table has been rectified. No other response required.</p> <p>Peer reviewer 2: The reviewer expresses a concern about a perceived circularity in the logic inherent in the PI. The assessment team has not found any such circularity or any other impediment to the scoring of this PI.</p> <p>The reviewer also suggests that the lack of estimates of fishing mortality is the largest uncertainty in the assessment of all the species in this fishery and that stock status indicators used such as catch rate and density are confounded by changes in recruitment. The assessment team recognised that the assessments use stock status indicators other than fishing mortality but regards the choice of indicators as appropriate for this fishery and does not consider this to be the major uncertainty.</p> <p>The suggested solution (for the teleosts at least) is to use data on age structure but this does not solve the problem as such data, even if able to be collected cost-effectively, are also affected by both recruitment and mortality. For example, shifts in the age composition towards relatively fewer older and more younger individuals may result from higher fishing mortality (potentially undesirable), improved recruitment of young animals (a positive sign), or a combination of the two. As the reviewer also notes, obtaining good estimates of fishing mortality is difficult for such small scale fisheries.</p> <p>No specific changes to scores are suggested for any species. No further response required.</p>	

Principle 2

Performance Indicator 2.1.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question: The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species. The Lakes and Coorong fishery targets seven main native species: mulloway, black bream, yellow-eye mullet, greenback flounder, pipi, golden perch, and bony bream. Of these, four species (mulloway, yellow-eye mullet, pipi, and golden perch) are the subject of assessment in P1 as a unit of certification. The retained target species for consideration in P2 are therefore black bream, greenback flounder and bony bream. Interestingly, the bony bream comprises more than 50% of the catch of the fishery by weight, but less than 10% by value. It is a fresh water fish, and is considered highly productive. The assessment report describes the information available and used to score the fishery. Therefore it appears that the assessment team has used all the available information.</p> <p>The Lakes and Coorong fishery meets issue A and the SG 60</p>	

	<p>and 80 levels, issue B is not met at the SG 100 level SG60 level, issue C is NA at the SG 60 and 80 levels, and issue D is NA at the SG 60 level. The assessment report indicates a score of 85 for the fishery, but if no individual issue score was met above the SG 80 level, that appears to be in incorrect score. The correct score should be 80.</p> <p>There are no conditions on the fishery for this PI.</p>	
Certification Body Response	<p>PI 2.1.1 The reviewer appears to have mis-read the scoring table for the scoring issues: issue A meets the requirements for SG60 and SG80; issue B does not meet the requirement for SG100. Nonetheless, issue B does meet the SG100 requirement for 2 of the 3 species being considered. The PI score of 85 is therefore appropriate and correct in this circumstance.</p>	

Performance Indicator 2.1.2		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI address the question: Is there a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species. The main retained target species (bony bream) is within the fisheries management system, and is subjected to annual stock status reports, but does not have a set of catch-based reference points assigned.</p>	<p>Regarding scoring rationale: The scoring for this PI relies in part on the presence of reference points. The reviewers reasonably note that the effectiveness of these is unclear for the scalefish because of their reliance on catch history. There is also the issue of undefined action when these points are exceeded. This has been confronted when the CPUE is exceeded, which can be</p>

	<p>There is therefore a strategy in place that is expected to maintain the main retained species at levels that are within biologically based limits, and ensure that the fishery does not hinder their normal biological dynamics or responses in the event of high flow conditions. Both black bream and greenback flounder (retained) are within the management system, have stock status reports, and have reference points set and reviewed annually. It appears that the MSC assessment team used all the available information to score the fishery.</p> <p>The Lakes and Coorong fishery was scored at 90 for this PI. This is based on the fishery meeting the SG60, 80, and 100 levels for issue A, meeting the SG 60 and 80 levels, but not SG 100 for issue B, meeting the SG 80 and 100 levels for issue C, the SG 100 level for issue D, and issue E was determined to be Not applicable. Therefore, it appears that the fishery may have been incorrectly given a low overall score, as the correct score should be 95.</p> <p>There are no conditions on the fishery for this PI.</p>	<p>interpreted as either a positive indicator (increasing abundance) or of concern (potential for greater fishing removals).</p>
Certification Body Response	<p>PI 2.1.2 Scoring issue aggregation was anomalous, and led to an incorrect PI score. We agree that the score should have been 95, and this is now corrected in the report.</p>	

Performance Indicator 2.1.3		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information	Yes.	Yes.

and/or rationale used to score this indicator support the given score? (yes/no)		
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI address the question: Is the information on the nature and extent of retained species adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species. The assessment team clearly evaluated all the relevant information is scoring this PI. The three retained target species (bony bream, greenback flounder, black bream) are within the fisheries management system. The system provides routine information about contemporary catch and effort relative to historical catch and effort for all three species, including bony bream (main retained). It appears that the assessment team utilized all the available information to score this fishery.</p> <p>The fishery meets issue A at SG60, 80 not 100 levels, level, issue B at the SG 60 and partially at the SG80 level, issue C at the SG 60 and 80 levels, but not the 100 level, and the issue D at the SG 80, but not 100 level. The fishery is appropriately scored at 80.</p> <p>There are no conditions on the fishery for this PI.</p>	<p>Regarding scoring rationale:</p> <p>The only area of weakness here appears to be with the absence of reference points for bony bream. The presence of risk assessments justifies the score.</p>
Certification Body Response	<p>No response required. However, the scoring for issue B was reviewed, and it is now assessed as meeting the requirements of SG80 as well as SG60. No adjustments are required to the PI score of 80, which remains.</p>	

Performance Indicator 2.2.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant	Yes.	Yes

information available been used to score this indicator? (yes/no)		
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Does the fishery pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species. According to the data presented in the assessment report, the Lakes and Coorong Fishery has very few bycatch (non-retained) species taken in this fishery, and these are taken in only low numbers. Although there is very limited independent observational data on bycatch, the fishery is considered to occasionally catch and retain (as byproduct) crabs, shrimps, rays, skates, sharks, as well as some finfish. As a result, there are no "main" bycatch species. It appears that the assessment team utilized all the available information to score this fishery.</p> <p>The Lakes and Coorong fishery met all the requirements for issue A at the SG 60 and 80 levels, but not 100. Issues B and C were determined to be not applicable. The fishery was appropriately scored at 80.</p> <p>There are no conditions required for the fishery on this PI.</p>	
Certification Body Response	No response required.	

Performance Indicator 2.2.2

	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Is there a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations. As noted for the previous PI, the assessment report there are no "main" bycatch species, but bycatch as a whole is constrained by both gear and deployment restraints used in the fishery and required within access/licence conditions. There is no specific and separate bycatch strategy, since the fishing strategies incorporate measures to minimize bycatch. It is clear that the assessment team has considered all the relevant information to score the fishery for this PI.</p> <p>The Lakes and Coorong Fishery met all the requirements for the SG 60, 80 and 100 levels of issue A, the requirements at the SG 60 and 80 levels for issue B, all the requirements for the SG 80 and 100 levels for issue C, and finally all the requirements for SG 100 on issue D. In the report the fishery is scored at 90, but it may be that 95 is more appropriate. Please check this.</p>	

	There are no required conditions on the fishery for this PI.	
Certification Body Response	Scoring issue aggregation was anomalous, and led to an incorrect PI score. We agree that the PI score should have been 95, and this is now corrected in the report.	

Performance Indicator 2.2.3		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	Yes.	Yes
Peer Reviewer Justification	<p>The PI addresses the question: Is the information on the nature and the amount of bycatch adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch. The data on bycatch is derived from a single recent study of the fishery, supported by fishery-dependent logbook records. There is no current ongoing program of independent observation of bycatch across the fishery, or system of synthesis and reporting that might be capable of detecting and triggering response action in the event of an increase in risk to bycatch species. It is clear from the assessment report that the team used all the relevant information to score the indicator.</p> <p>The Lakes and Cooring fishery meets the SG 60 and 80 levels, but not the 100 level with</p>	<p>The absence of ongoing or periodic monitoring of bycatch means there is no ability to detect changes in rate from the single study of the fishery. The condition addresses this need.</p>

	<p>respect to issue A. for issue B, the fishery meets then SG 60 and 80 levels, but again not the 100 level. For issue C, the fishery meets the SG 60 and 80 levels, but not the 100 level. And finally for issue D, the fishery meets neither the SG 80 nor 100 level requirements. The fishery is appropriately scored at 75, and there is a condition. The condition states that the by the second surveillance audit provide evidence to the CAB that an ongoing fishery independent bycatch observation/ reporting program, to detect any increase in risk to bycatch species, has been implemented, of a design suitable for the scale of the fishery.</p>	
Certification Body Response	No response required.	

Performance Indicator 2.3.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the questions: Does the fishery meet national and international requirements for the protection of ETP species, and does the fishery not pose a risk of serious or irreversible harm to ETP species and not hinder recovery of ETP species. At least 11 species of nationally-recognised ETP species are caught or interact</p>	

	<p>with the fishery at various times. However, the risks of the fishery to these species have been rated as low or negligible, and in addition to the low numbers of reported catch, all ETP species reported as bycatch have been released alive. The assessment report presents all the relevant information, and it is clear that the assessment team used that information to score the fishery for this indicator.</p> <p>The Lakes and Cooring Fishery meets the SG 60 and 80 levels, but not the SG 100 for issue B, and meets the SG 80 and 100 levels for issue C. Issue A was determined to be not applicable. The fishery is appropriately scored at 90.</p> <p>There are no conditions required of the fishery for this PI.</p>	
Certification Body Response	No response required.	

Performance Indicator 2.3.2A		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This review is based on the alternate 2.3.2 presentation in the report.</p> <p>This PI addresses the</p>	

	<p>question: Does the fishery have in place precautionary management strategies designed to:</p> <p>meet national and international requirements; ensure the fishery does not pose a risk of serious harm to ETP species;</p> <p>ensure the fishery does not hinder recovery of ETP species; and minimize mortality of ETP species. The input control measures (particularly gear types) in the fishery provide an effective although partial strategy for controlling direct interaction with ETP species. Additionally, There is limited fishery-independent monitoring of impacts on ETP (conducted by PIRSA Compliance) which confirms the very low rate of ETP impact/catch from fishing gear. Therefore it appears that the assessment report presents all the relevant information available, and the assessment clearly used this information to score the indicator.</p> <p>The Lakes and Cooring fishery meets all two of the issues at the SG60 level, all three of the issues for the SG80 level, and none of the issues at the SG100 level. The fishery is scored at 85 in the report, but since none of the individual issue SG scores were greater than 80, it appears that this may have been in incorrect score, as the correct score should be 80.</p> <p>There are no conditions</p>	
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	required of the fishery for this PI.	
Certification Body Response	Scoring issue aggregation was anomalous, and led to an incorrect PI score. We agree that the score should have been 80, and this is now corrected in the report.	

Performance Indicator 2.3.3		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Is relevant information collected to support the management of fishery impacts on ETP species including: information for the development of the management strategy; information to assess the effectiveness of the management strategy; and information to determine the outcome status of ETP species. The available information base, while limited, indicates a very low rate of interaction for all ETP species known to exist in the region of the fishery. Sufficient information is therefore available to make quantitative estimates of the impacts of fishing, consistent, however this does not permit a 'high degree of certainty'. The assessment team clearly</p>	

	<p>used all the relevant information presented in the assessment report to score this indicator.</p> <p>The Lakes and Cooring fishery meets all three of the issues at the SG60 level, all three of the issues for the SG80 level, and none of the issues at the SG100 level. The fishery is appropriately scored at 80.</p> <p>There are no conditions required of the fishery for this PI.</p>	
Certification Body Response	No response required.	

Performance Indicator 2.4.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	No
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI address the question: Does the fishery cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis and function. Most disturbance to habitat is created by the pipi component of the fishery, which uses hand rakes to expose the pipis from the sand for hand collection. The mesh nets in the fishery do not routinely make contact with the seabed. The input controls and fishery practice are</p>	<p>SG100 appears appropriate. As the team notes, "<i>most disturbance to habitat is created by the pipi component of the fishery, which uses hand rakes .. on the beachwash zone of the surf beach.</i>" SG100 requires evidence of the benign nature of the gear. In this case there is no formal report or paper on habitat impacts of these fishery, which led to the score of 80. However there's ample generic evidence that beachwash zones are dynamic – clearly hand raking will not impact this habitat.</p>

	<p>consistent with protecting the habitat. The assessment team clearly used all the relevant information presented in the assessment report to score the fishery for this indicator.</p> <p>The Lakes and Cooring fishery meets the one required issue at the SG60 level, the one required issue for the SG80 level, and the partially meets required issue at the SG100 level. The fishery is appropriately scored at 90.</p> <p>There are no conditions required of the fishery for this PI.</p>	
Certification Body Response	<p>PR 2: Without actual evidence that the hand raking has 'no impact' on the function of the habitat, the score cannot be 100. While the beachwash zone is dynamic, this in itself does not necessarily infer that other species will not be impacted. Pipsis are impacted by this process, so it is clear that there is potential for impacts on sympatric species that may also live in this habitat zone. In particular, other species that occupy the beachwash area (beach infauna, such as polychaetes) may be impacted by raking at the times of fishing given its local extent and intensity, and its focus around the river mouth, which is likely to be a local sub-class of the beach habitat. While the risk is likely to be low, the evidence is not available to assign 100, and the score of 90 is more consistent with the guidelines in this matter.</p> <p>We reject the assertion that the PI meets SG100, and the justification text in the report has been slightly expanded to refer to this in more detail.</p>	

Performance Indicator 2.4.2		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes.
Will the condition(s) raised improve the fishery's	NA.	N/A

performance to the SG80 level? (yes/no/NA)		
Peer Reviewer Justification	<p>This PI addresses the question: Is there a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types? The gear type constraints and the way in which these gears are deployed in relation to the sensitivity of the habitats effectively constitute an input control strategy that has the effect of limiting contact of gear with habitats that might be sensitive to disturbance, and permits active disturbance where the habitat (surf zone seabed) is less sensitive to the ecological effects of structural or functional disturbance. The assessment report utilizes all the relevant information to score the fishery for this indicator.</p> <p>The Lakes and Cooring fishery meets all two of the issues at the SG60 level, all three of the issues for the SG80 level, and two of the four of the issues at the SG100 level. The fishery is appropriately scored at 90.</p> <p>There are no conditions required of the fishery for this PI.</p>	<p>Possibly outside the scope of this PI, the effect of vehicles on surf beaches was not considered. There is a strategy in place for management of this activity so scoring is appropriate.</p>
Certification Body Response	<p>PR2: the impacts of vehicle traffic and human access to the beach was explicitly included and assessed within the bird risk assessment. The justification text has been slightly expanded to include mention of the vehicle traffic and fishers on the beach.</p>	

Performance Indicator 2.4.3		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information	Yes.	Yes

and/or rationale used to score this indicator support the given score? (yes/no)		
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Is the information adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types? There are detailed maps and descriptions of the relevant habitats where the fishery operates, with excellent detail on distribution and vulnerability to environmental pressures, as a result of the major ecological studies conducted in the Lakes and Coorong region. Additionally, the impact of the various gears used in the fishery are well understood. The assessment team utilized this information as presented in the assessment report to score this indicator for the fishery.</p> <p>The Lakes and Coorong fishery meets all two of the issues at the SG60 level, all three of the issues for the SG80 level, one of three of the issues at the SG100, and partially meets one more issue at the SG 100 level. The fishery is appropriately scored at 90.</p> <p>There are no conditions required on the fishery for this PI.</p>	
Certification Body Response	No response required.	

Performance Indicator 2.5.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Does the fishery cause serious or irreversible harm to the key elements of ecosystem structure and function. There has been documented a progressive decline in species diversity of fish in the freshwater and estuarine regions of the Lakes and Coorong ecosystem. This includes a number of the key fish species that occur in the ecosystem. The fishery is considered here to have possibly greater than negligible interaction with some of the factors consider in the assessment of ecosystem health. With all this information, the assessment team considered that the current management of the fishery supports to maintain the underlying ecosystem structure of the resource.</p> <p>The Lakes and Coorong fishery meets the required issue at the SG60 level, the required issue for the SG80 level, and does not meet the required issue at the SG100 level. The fishery is scored at 85, but because the</p>	

	<p>evaluation clearly states that the requirements of the SG 100 level are not met, the correct score for this PI should be 80.</p> <p>There are no conditions required on the fishery for this PI.</p>	
Certification Body Response	<p>We disagree with the proposed PI score of 80, rather than our assigned score of 85. In cases where there is only a single guidepost issue to be assessed, there can be adjustment of the PI score to reflect the balance of matters contributing to the issues being assessed. Here we consider that the performance of the fishery is higher than the 80 level because there has been some limited scientific analysis of the potential of the fishery to have ecosystem level impacts, which we consider to be evidence for 'highly unlikely to disrupt....', significantly exceeding the requirement of SG80. This situation is outlined in the rational for this performance indicator. Therefore, we reject to reviewers statement that the PI score should be reduced, and the score remains as 85.</p>	

Performance Indicator 2.5.2		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Are there measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function? The fishery is controlled by the management system, which may be considered to be an assemblage of measures operating within a unified strategy designed to manage the fishery to achieve both</p>	

	<p>ecosystem and environmental outcomes as well as fishery production outcomes. The assessment team utilized all the relevant information to score the fishery on this indicator.</p> <p>The Lakes and Coorong fishery meets all three of the issues at the SG60 level, all four of the issues for the SG80 level, and one of the four of the issues at the SG100 level. The fishery is appropriately scored at 85.</p> <p>There are no conditions required of the fishery for this PI.</p>	
Certification Body Response	No response required.	

Performance Indicator 2.5.3		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA.	No
Peer Reviewer Justification	<p>This PI addresses the question: Is there adequate knowledge of the impacts of the fishery on the ecosystem? Sufficient data are collected on catch and effort for the targeted and retained species, and on the operation of the measures in the fishery. However, it is not known if the catch measures will protect the ecosystem, and specifically if the reference points will maintain or even enhance population structure across the range of retained/target</p>	<p>It's not clear from Condition 6 that the fishery will be able to meet 2.5.3.e in future. This PI requires an element of ongoing monitoring – "<i>that Sufficient data continue to be collected to detect any increase in risk level</i>". Determining the type of indicators that could be monitored will be an output of the study required in the condition. But there should also be a requirement in the last surveillance audit for demonstration that there is a plan and resourcing for</p>

	<p>species to meet concerns about a lack of resilience in populations. A condition requiring additional information on this matter is appropriate. The assessment team utilized all the available information in the report to score the fishery.</p> <p>The Lakes and Coorong fishery meets all two of the issues at the SG60 level, three of the five of the issues for the SG80 level, and none of the issues at the SG100 level. The fishery is appropriately scored at 75.</p> <p>There is one condition required of the fishery for this PI. Condition 6 requires that the fishery over the period of the certificate conduct a study on the main impacts of the fishery on key ecosystem elements, and that this study should include an assessment of the ecological role of the truncated population structure in the trophic relationships of black bream and greenback flounder in the Coorong.</p>	<p>continued data collection.</p>
<p>Certification Body Response</p>	<p>PR2 Agreed. The text for Condition 6 has now been extended to require, at the 4th surveillance audit, a plan to be submitted for ongoing monitoring, including resourcing.</p>	

Principle 3

Performance Indicator 3.1.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Does the management system exist within an appropriate legal and/or customary framework which ensures that it: Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and Incorporates an appropriate dispute resolution framework.</p> <p>The assessment report and the scoring evaluation table describes in detail the management system, relevant laws, and the practical aspects of management, in detail. Therefore the assessment team utilized all the relevant information presented in the assessment report to score the fishery on this PI.</p> <p>The Lakes and Coorong fishery</p>	

	<p>meets all three of the scoring issues at SG 60 and SG 80 levels and 2 of 3 issues at SG 100 level. Therefore, the score of 95 for this PI is appropriate.</p> <p>There are no conditions required of the fishery for this PI.</p>	
Certification Body Response	Not required	

Performance Indicator 3.1.2		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	Yes.	N/A
Peer Reviewer Justification	<p>This PI addresses the questions: Does the management system have an effective consultation processes that are open to interested and affected parties; Are the roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties? The assessment report clearly describes the management process, the management plan, the consultation process, and decision making process. The Fisheries Management Act of 2007 is referenced as the enabling legislation for the Lakes and Cooring</p>	<p>This PI deals with the use of stakeholder information and appropriately seeks to ensure that this is collected and that its application for management is transparent. The scoring and rationale for this is appropriate. However there is also discussion on the structure of the co-management system.</p> <p>There's a distinction here between seeking stakeholder input versus decision-making, which is blurred in this discussion. For example on P5 there is a statement that the bottom-up approach to fisheries management makes this fishery well suited to MSC certification. And for 3.1.2b the move from consultative co-management to delegated co-management (where more control is given</p>

	<p>Fishery. Therefore the assessment team has utilized all the relevant information presented in the assessment report to score the fishery for this indicator.</p> <p>For the Lakes and Coorong fishery all the scoring issues at SG 60 and SG 80 level and 1 of 3 issues at 100 level are met. Therefore the score should be 85. The evaluation table in the report indicates a score of 80, and refers to condition 6? This appears to be an error? Table 6.2, the Summary of the Scores indicates a score of 75 for this PI, again an error.</p> <p>There should be no conditions required of the fishery for this PI, as there are no scores below 80.</p>	<p>to industry councils) is discussed positively. These opinions are debatable - some of the most difficult but necessary decisions have required a strong top-down approach by regulators. The changes in co-management are intended to reduce disagreement between government and stakeholders but sometimes disagreement is healthy because motivations are different. Bottom-up approaches can also work but only in situations and with issues where there's a strong incentive for stewardship and a suite of other social factors in place. These aren't always present. This is part of the reason why harvest strategies are needed and why the team was justified in emphasizing the need for a HS in the LCF.</p>
<p>Certification Body Response</p>	<p>Peer Reviewer 1 comments: Agreed. The score should be revised to 85 and the reference to a condition removed. The report has been amended.</p> <p>Peer Reviewer 2 comments. On reflection, the comment in the report about moving to a more formal com-management approach is, in any case, premature and is not relevant to the current management framework. This comment has been removed.</p>	

Performance Indicator 3.1.3		
	Peer Reviewer 1	Peer Reviewer 2
<p>Has all the relevant information available been used to score this indicator? (yes/no)</p>	Yes.	Yes
<p>Does the information and/or rationale used to score this indicator support the given score? (yes/no)</p>	Yes.	Yes
<p>Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)</p>	Yes.	N/A
<p>Peer Reviewer Justification</p>	The question addressed in this	

	<p>PI is: Does the management policy have clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach. The assessment report notes that the long-term objectives of the Lakes and Coorong Fishery are specified in the 2005 Management Plan which reflected the objectives of the <i>Fisheries Act 1982</i>. While a new Fisheries Management Act came into force in 2007 the objectives of the Management Plan remain consistent with the objectives specified in the new FMA. Fisheries Management Act of 2007 further describes the management process, and other relevant processes related to management of the Lakes and Coorong Fishery. Therefore the assessment report has considered all the relevant information available to score the fishery for this PI.</p> <p>With regard to scoring, the Lakes and Coorong Fishery met the SG 60, 80 and 100 requirements for the single issue associated with this PI. Therefore the fishery was appropriately scored at 100.</p> <p>There are no conditions on the fishery related to this PI.</p>	
Certification Body Response	No response required	

Performance Indicator 3.1.4		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	No.
Does the information	Yes.	Yes.

and/or rationale used to score this indicator support the given score? (yes/no)		
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Does the management system provide economic and social incentives for sustainable fishing and does the fishery operate with subsidies that contribute to unsustainable fishing? The assessment report describes the requirement that the commercial fishing industry in South Australia is obliged to meet the agreed costs of all services required to support the commercial sector, including research (biological and economic), management and compliance, as well as a range of additional services in support of the industry. The policy requires commercial fishery licence fees to fund 100% of commercial fisheries management costs. PIRSA consults with service providers and relevant industry associations on the fishery based management programs which form the basis of license fees for the following license year. License fees in the Lakes and Coorong Fishery are, therefore, calculated on a cost-recovery basis and these fees vary annually depending on research, compliance and management priorities. There is therefore, no subsidization of the management costs of the fishery. The assessment team has utilized all the relevant information presented in the assessment report to score the fishery for this PI.</p> <p>The Lakes and Coorong</p>	<p>Limited entry applies in this system and the scoring is appropriate. However it is worth noting that a potential weakness in the cost recovery system is that PIRSA consults with industry associations on the programs, which are then funded through licence fees. This may or may not best practice depending on the scope of this consultation. The issue here is that the needs and motivations of the fishers and the community owners of the resource are not always aligned. This risk wasn't apparent in comments in the assessment, which seemed to view industry scrutiny of management costs as always positive.</p> <p>There are some issues in the discussion on changes in licensing arrangements and their effect on incentives. This includes misleading use of the term "access right". These are not rights, they are simply allocations and PIRSA is correct to consider any changes to license duration carefully. This text should be revised as the term "rights" is misleading and creates false expectations. The proposed changes to a period of longer than annual license renewal resolves the problem of high discount rates (perverse incentive) for fishers but only in respect to stock issues (Principle 1, which relies on harvest strategies anyway), not ecosystem issues</p>

	<p>fishery met requirements at the SG 60, 80 and 100 levels for the single issue related to this PI. Therefore the fishery was appropriately scored at 100.</p> <p>There are no conditions on the fishery for this PI</p>	<p>(Principle 2).</p> <p>A significant and well-considered incentive not discussed is that regulations retain the owner-operator nature of the fishery and control the number of operators per vessel. This is a step towards linking the owners with the objectives of Principle 2 as they're present on the vessel at the point of interactions and solves the problem of many quota fisheries dominated by leasees.</p>
Certification Body Response	<p>Peer Reviewer 1 comments: No response required Peer reviewer 2 comments: reference to access "right" have been removed as suggested. With respect to the view that owner-operator arrangements are more likely to engender positive incentives for stewardship than arrangements that allow for leasing, the team is not aware of any research that supports this contention. As a result this has not been identified in the report as a positive incentive.</p>	

Performance Indicator 3.2.1		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA	N/A
Peer Reviewer Justification	<p>This PI addresses the question: Does the fishery have clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2. The Management Plan instituted in 2005 includes four clear, specific long-term objectives</p>	

	<p>consistent with MSC Principles 1 and 2. The Plan also identifies short-term objectives associated with each of these long-term goals. The Management Plan includes a harvest strategy which originally applied to all sectors of the fishery. The harvest strategy directly addresses each of the goals and sub-objectives of the Management Plan and includes management strategies, performance indicators and reference points/triggers. Therefore the assessment team has utilized all the relevant information in the assessment report to score the fishery for this PI.</p> <p>The Lakes and Cooring fishery met the requirements at the SG 60, 80 and 100 levels for the single issue related to this PI. Therefore the fishery was appropriately scored at 100</p> <p>There are no required conditions on the fishery.</p>	
Certification Body Response	No response required	

Performance Indicator 3.2.2		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	Yes	Yes
Peer Reviewer Justification	This PI addresses the	Note that the team

	<p>question: Does the fishery-specific management system include effective decision-making processes that result in measures and strategies to achieve the objectives?</p> <p>There is a fishery wide harvest strategy in place that specify management strategies to achieve the fishery specific objectives. The fishery-wide harvest strategy includes broad management responses to breaching of reference points in terms of notification of the Minister, detailed review and consultation with key stakeholder groups. Decisions taken by the Minister are required to be gazetted publicly. While there is a considerable amount of publicly available information on the fishery, there is no centralized site for accessing this information. This does not facilitate stakeholder understanding of the fishery, its management or its performance. Therefore it appears that the assessment team has clearly utilized all the relevant information presented in the assessment report to score the fishery for this indicator.</p> <p>The Lakes and Cooring fishery met all four of the issues at the SG 60 level, four of five issues at the SG 80 level, and one of three issues at the SG 100 level. Because one of the issues at the SG 80 level was not met, a condition is required. The fishery was appropriately scored at 75 for this PI.</p>	<p>commented under 3.2.2d that the pipi harvest strategy was not available online, however, it is now provided as an appendix to Ferguson 2013 and available through the SARDI website. This is perhaps part of progress towards Condition 7 that has occurred since the review.</p>
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	Condition 7 requires that the fishery shall demonstrate that processes are in place to ensure that explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity	
Certification Body Response	Peer Reviewer 1 comments: No response required Peer Reviewer 2 comments: Text amended to reflect availability of the harvest strategy	

Performance Indicator 3.2.3		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	NA	N/A
Peer Reviewer Justification	This PI addresses the question: Do the monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with? There is a comprehensive monitoring, control and surveillance system in place implemented by the Fisheries and Aquaculture Operations Group of PIRSA Fisheries Division. Separate compliance plans for the net and pipi sectors of the Lakes and Coorong Fishery are developed in consultation with fishery industry representatives. Compliance	

	<p>activities are conducted on land and at sea. Sanctions to deal with non-compliance are in place. The available compliance information suggests that these are consistently applied and that there is a high level of compliance indicating that the sanctions provide effective deterrence.</p> <p>Therefore it appears that the assessment team has utilized all the relevant information in the assessment report to score the fishery for this PI.</p> <p>The Lakes and Coorong Fishery met all three of the issues at the SG 60 level, all three of the issues at the SG 80 level, and all three of the issues at the SG 100 level. Therefore the fishery was correctly given the score of 100.</p> <p>There are no required conditions on the fishery for this PI.</p>	
Certification Body Response	No response required	

Performance Indicator 3.2.4		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes	Yes.
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes	Yes.
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	Yes	Yes.
Peer Reviewer Justification	This PI addresses the questions: Does the fishery has a research plan that addresses the information needs of management?	3.2.4a is addressed by the rationale and condition for the development of a research plan. It could be helpful to require that the research plan is updated through time, perhaps as part

	<p>The Management Plan for the Lakes and Coorong Fishery includes a Strategic Research and Monitoring Plan. However, this plan does not constitute a strategic approach that is pro-active, anticipatory or designed to identify gaps in knowledge on all aspects of the fishery. As a result it cannot be concluded that the Lakes and Coorong Fishery has a research plan that is capable of providing the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. Therefore the assessment team has utilizes all the relevant information presented in the assessment report to score the fishery for this PI.</p> <p>The Lakes and Coorong Fishery met all the scoring issues at SG 60 level, one of the two issues at the SG 80 level, and none of the issues at the SG 100. Therefore the fishery was correctly given the score of 70 and a condition is required.</p> <p>Condition 7 requires that the fishery develop a research plan that provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. The strategic approach adopted in</p>	<p>of the management plan cycle.</p> <p>A minor issue is that there appeared to be no consideration of popular articles produced on the fishery at 3.2.4b.</p>
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	the research plan should be pro-active, anticipatory and capable of identifying gaps in knowledge in advance of management needs.	
Certification Body Response	<p>Peer Reviewer 1 comments: No response required</p> <p>Peer reviewer 2 comments: With respect to the suggestion to include a requirement to regularly update the research plan, it is noted that this is not an explicit requirement of the performance indicator. However it is considered that the need for updating is implicit in the condition's requirements for a plan that takes a strategic approach, provides timely information and that is proactive and anticipatory. No changes were made to the report.</p> <p>With respect to the reference to 'popular articles produced on the fishery', without knowing which articles are being referred to it is not possible to determine whether these articles report the results of research. No changes were made to the report.</p>	

Performance Indicator 3.2.5		
	Peer Reviewer 1	Peer Reviewer 2
Has all the relevant information available been used to score this indicator? (yes/no)	Yes.	Yes
Does the information and/or rationale used to score this indicator support the given score? (yes/no)	Yes.	Yes
Will the condition(s) raised improve the fishery's performance to the SG80 level? (yes/no/NA)	Yes.	Yes
Peer Reviewer Justification	<p>This PI address the question: Is there a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives, and is there effective and timely review of the fishery-specific management system? The assessment report describes a situation where: there is no formal process to review research needs in the fishery, there is no system of regular internal review of the performance</p>	

	<p>of the management system against the objectives of the management plan, and there is only occasional external review of some aspects of the management system. Therefore the assessment team appears to have utilized all the relevant information presented in the assessment report to score the fishery for this PI.</p> <p>The Lakes and Coorong Fishery met the two issues at the SG 60 level, one of two issues at the SG 80 level, and none of the issues at SG 100. Therefore the fishery was correctly given the score of 70, and a condition is required.</p> <p>Condition 9 requires that the fishery ensure that the management system is subject to regular internal and occasional external review.</p>	
Certification Body Response	No response required	

Any Other Comments (optional)		
	Peer Reviewer 1	Peer Reviewer 2
Certification Body Response		

Appendix 3. Stakeholder submissions

No stakeholder submissions have been received to date (up to the Public Comment Draft Report stage).

1. The report shall include:
 - a. All written submissions made by stakeholders during consultation opportunities listed in CR 27.15.3.1
 - b. All written and a detailed summary of verbal submissions received during site visits regarding issues of concern material to the outcome of the assessment (*Reference CR 27.15.3.2*)
 - c. Explicit responses from the team to stakeholder submissions included in line with above requirements (*Reference CR 27.15.3.3*)

(REQUIRED FOR FR AND PCR)

2. The report shall include all written submissions made by stakeholders about the public comment draft report in full, together with the explicit responses of the team to points raised in comments on the public comment draft report that identify:
 - a. Specifically what (if any) changes to scoring, rationales, or conditions have been made.
 - b. A substantiated justification for not making changes where stakeholders suggest changes but the team makes no change.

(Reference: CR 27.15.4)

Appendix 4. Surveillance Frequency

(REQUIRED FOR THE PCR ONLY)

1. The report shall include a rationale for determining the surveillance score.
2. The report shall include a completed fishery surveillance plan table using the results from assessments described in CR 27.22.1

Table A4: Fishery Surveillance Plan

Score from CR Table C3	Surveillance Category	Year 1	Year 2	Year 3	Year 4
[e.g. 2 or more]	[e.g. Normal Surveillance]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit & re-certification site visit]

Appendix 4. Client Agreement

(REQUIRED FOR PCR)

The report shall include confirmation from the CAB that the Client has accepted the PCR.
This may be a statement from the CAB, or a signature or statement from the client.

(Reference: CR: 27.19.2)

Appendix 5.1 Objections Process

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

Appendix 6: List of license holders active in the Lakes and Coorong Fishery

REGISTRATION ID	FIRST NAME	SURNAME	Location
L03	Glendan	Hill	MENINGIE SA 5264
L04	Timothy	Ayres	MENINGIE SA 5264
L05	Stephen	Milverton	MILDURA SOUTH VIC 3501
L07	Edward	Black	MENINGIE SA 5264
L08	Christopher	Wilton	PORT ELLIOT SA 5212
L10	Michael	Jolly	GOOLWA SA 5214
L11	David	Reichelt	MENINGIE SA 5264
L12	Perry	Robinson	Kent Street MURRAY BRIDGE SA 5253
L13	Gary	Hera-Singh	MENINGIE SA 5264
L14	Christopher	Wilton	PORT ELLIOT SA 5212
L15	David	Backen	PORT LINCOLN SA 5606
L16	Roderick	Dennis	GOOLWA SA 5214
L17	Eric	Hayward	MENINGIE SA 5264
L18	Raymond	Modra	MENINGIE SA 5264
L19	Nathan	Mammone	MENINGIE SA 5264
L20	Debra	Kessegian	GOOLWA SA 5214
L21	Henry	Jones	CLAYTON BAY SA 5256
L26	Trevor	Lucieer	MENINGIE SA 5264
L27	Krikor	Kessegian	MOUNT GAMBIER SA 5290
L29	Barry	Moore	KINGSTON SE SA 5275
L30	Daryl	Edson	MENINGIE SA 5264
L31	Adrian	Phillips	STRATHALBYN SA 5255
L33	Timothy	Richards	MENINGIE SA 5264
L34	James	Ritchie	MENINGIE SA 5264
L35	Brian	Brooks	MENINGIE SA 5264
L36	Robert	Brooks	MENINGIE SA 5264
L37	Zane	Skrypek	GOOLWA SA 5214
L38	Steve	Alexander	MENINGIE SA 5264
L39	Christopher	Brown	MENINGIE SA 5264
L40	Perry	Gibbs	MENINGIE SA 5264
L41	Timothy	Hoad	MURRAY BRIDGE SA 5253
L42	Brian	Brooks	MENINGIE SA 5264
L43	Michael	Gibbs	MENINGIE SA 5264
L44	Rodney	Ayres	PORT ELLIOT SA 5212
L45	Darren	Hoad	GOOLWA SA 5214
L47	Matthew	Hoad	MENINGIE SA 5264

Appendix 7: Ecological Risk Assessment.

**Ecological Risk Assessment
The Lakes and Coorong Fisheries**

**Workshop Procedure:
Fishing interactions and threats to listed bird species**

**Prepared for the
Southern Fishermen's Association**

March 2013

e-systems

Stoklosa, R 2013. *Ecological Risk Assessment, The Lakes and Coorong Fisheries—Workshop Procedure: Fishing interactions and threats to listed bird species*. Prepared for the Southern Fishermen’s Association. E-Systems Pty Limited, Hobart.

Revision 0 5 March 2013 For distribution to participants.

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Introduction

The Lakes and Coorong Fishery (L&C fishery) are certified as a sustainable fishery under the Marine Stewardship Council (MSC). As part of the assessment process, an ecological risk assessment (ERA) was undertaken in 2011 (PIRSA 2011). Following the 2011 risk assessment, conditions were imposed on the certification of the fishery by the MSC assessors.

This ERA is to address Condition 25 of the MSC certification of The Lakes and Coorong Fisheries, which has been identified as a ‘major non-conformance’ in the *2012 MSC Surveillance Visit Report*. The requirement is to:

‘...conduct a risk assessment workshop with an appropriate range of stakeholders and that is focused on assessing the risks of the fishery to listed species of birds that inhabit the Coorong, and particularly the Fairy Tern. The client shall conduct an expert workshop to identify the key risks of the fishery to birds, and to establish a short list of research priorities to address research gaps related to those risks.’

The Southern Fishermen’s Association (SFA) engaged Mr Richard Stoklosa FIEAust, NPER, MAICD of E-Systems Pty Limited to prepare for and facilitate the required ERA to address Condition 25.

The ERA will use the methods of the CSIRO/AFMA *Ecological Risk Assessment for the Effects of Fishing* (ERAEF) (Hobday et al. 2007)—but only for the bird bycatch/threatened, endangered or protected (TEP) component of the assessment.

The ERAEF methodology generally calls for a Scoping effort, followed by a Level 1 Scale, Intensity, Consequence Analysis (SICA) type of analysis which is arguably more robust and repeatable than other Delphi methods. Much of the Scoping information for the ERAEF methodology is contained in the PIRSA ERA report (March 2011). The Scoping effort will be narrowly focused on bird TEP species.

The SICA analysis requires the involvement of bird ecologists, and will be undertaken in a workshop which invite stakeholder participation. Information from species recovery plans under the EPBC Act will be used to fill in the gaps for management objectives and indicators for TEP species, or from information provided by bird ecologists.

This document describes the procedure for conducting the ERA workshop with persons having specialised expertise in the subject matter, facilitated by E-Systems.

Stakeholder Working Group

A Stakeholder Working Group will be invited by SFA to participate in the ERA workshop. Stakeholders may include individuals, organisations, companies, government agencies and research scientists with an interest and/or technical expertise. SFA should nominate a list of stakeholders who have expressed an interest in the MSC certification process for the L&C fishery, so that nominated participants can be invited to attend, and be informed of preparations for the workshop.

The Stakeholder Working Group will receive information from the 2011 ERA, with updated information on technical documents and management actions that will be considered to assess the risk to listed bird species. There will be an opportunity for any member of the Stakeholder Working Group to propose other published information to SFA for review by all participants prior to the workshop. Documents will need to be received by SFA in digital format prior to the workshop date for distribution.

The total number of persons attending the workshop should be limited to allow for efficient consideration of technical issues, whilst ensuring that all stakeholder views are appropriately represented. It would also be appropriate to include non-participating observers from special interest groups (observers include persons with management roles and officers of organisations).

Technical Panel

A Technical Panel should be identified with the support of a range of stakeholders, as part of the Stakeholder Working Group. The Technical Panel will encompass appropriate scientific disciplines, with a balanced representation of government, industry, non-government organisation and independent conservation specialists. Although there is no formula to use to obtain a ‘perfect’ mix of representation, the goal should be to represent the range of stakeholder interests with persons who demonstrate recognised experience and qualifications in the subject matter, and have the capacity to provide high quality technical expertise for risk analysis. Stakeholders should therefore nominate appropriately qualified scientists for participation in the Technical Panel, aiming for a panel size of three to five scientific experts.

The Technical Panel’s role in the workshop is to assess the risks to listed bird species, based on full consideration of published information and the management actions formally adopted by the L&C fishery or committed to by the government.

The Technical Panel should also re-assess the treated risk level for any management actions that might be suggested by the Stakeholder Working Group during the workshop. The treated risk level informs the selection of appropriate management actions that may be found to be feasible to implement and have favourable cost/benefit outcomes.

Workshop procedure

The starting point for the subject workshop is the information contained in the 2011 ERA (PIRSA 2011, refer to Section 4.2 Non-Retained Species) and the technical documents that will be provided to workshop participants in advance of the workshop date.

The workshop participants will consider the interaction of fishing activities with bird species and identify threats for assessment. The purpose of the workshop with regard to MSC Condition 25 is to assess threats to listed bird species, however, workshop participants will have the opportunity to consider non-listed species which may be identified as having frequent interactions with fishing gear.

Risk analysis

The risk analysis procedure is adopted from the ERAEF methodology for undertaking a SICA (Level 1) assessment (Hobday et al. 2007). It relies on expert judgment, in this case a Technical Panel, to make qualitative estimates of the scale, intensity and consequences of a threat. The method is rigorous, and establishes a baseline for future assessments.

The Technical Panel is to make informed judgements of the potential consequences and likelihood of hazards associated with the L&C fishery interaction with birds, with respect to the adopted assessment criteria. It is the role of the facilitator to guide the process and maintain the integrity of the approach. The main focus of the workshop is to re-assess credible threats to listed bird (threatened, endangered and protected; or TEP) components of the ecosystem — based on available expert knowledge, technical documentation and data.

The SICA methodology involves scoring of scale, intensity and consequences of fishing interactions with ecological components (eg TEP species) and sub-components (eg population size, geographic range, genetic structure, age/sex/size structure, reproductive capacity, behaviour/movement, interaction with fishery). When undertaking the analysis, the sub-component most likely to be affected by fishing activity is selected for scoring.

The spatial scale of fishing activity is scored using the criteria in Table 1. The temporal scale of fishing activity is scored using the criteria in Table 2. The intensity score for fishing activity is scored using the criteria in Table 3.

The criteria for qualitative judgments of consequences are presented for TEP species (the relevant ecological component) and each sub-component, shown in Table 4.

For each threat, the confidence of predicting the consequences is qualitatively estimated by using Table 5.

Table 1. Spatial scale of fishing activity (nautical miles).

Spatial extent of fishing (nm)	< 1	1-10	10-100	100-500	500-1,000	> 1,000
Score	1	2	3	4	5	6

Table 2. Temporal scale of fishing activity (annual frequency).

Frequency of fishing	Decadal (1 day every 10 yrs or so)	Every several years (1 day every several yrs)	Annual (1-100 days per yr)	Quarterly (100-200 days per yr)	Weekly (200-300 days per yr)	Daily (300-365 days per yr)
Score	1	2	3	4	5	6

Table 3. Intensity score of activity.

Level	Score	Description
Negligible	1	Remote likelihood of detection at any spatial or temporal scale.
Minor	2	Occurs rarely or in few restricted locations and detectability even at these scales is rare.
Moderate	3	Moderate at broader spatial scale; or severe but local.
Major	4	Severe and occurs reasonably often at broad spatial scale.
Severe	5	Occasional but very severe and localized; or less severe but widespread and frequent.
Intolerable	6	Local to regional severity; or continuous and widespread.

Table 4. Consequence ratings for TEP species.

Sub-component	Score/level					
	1 Negligible	2 Minor	3 Moderate	4 Major	5 Severe	6 Intolerable
Population size	Almost none are killed.	Insignificant change to population size/growth rate. Unlikely to be detectable against background variability for this population.	State of reduction on the rate of increase are at the maximum acceptable level. Possible detectable change in size/ growth rate (r) but minimal impact on population size and none on dynamics of TEP species.	Affecting recruitment state of stocks or their capacity to increase.	Local extinctions are imminent/immediate.	Global extinctions are imminent/immediate.
Geographic range	No interactions leading to impact on geographic range.	No detectable change in geographic range. Unlikely to be detectable against background variability for this population.	Possible detectable change in geographic range but minimal impact on population range and none on dynamics. Change in geographic range up to 5 % of original.	Change in geographic range up to 10% of original.	Change in geographic range up to 25% of original.	
Genetic structure	No interactions leading to impact on genetic structure.	No detectable change in genetic structure. Unlikely to be detectable against background variability for this population.	Possible detectable change in genetic structure but minimal impact at population level. Any change in frequency of genotypes, effective population size or number of spawning units up to 5%.	Moderate change in genetic structure. Change in frequency of genotypes, effective population size or number of spawning units up to 10%.	Change in frequency of genotypes, effective population size or number of spawning units up to 25%.	

Table 4. Consequence ratings for TEP species (continued).

Sub-component	Score/level					
	1 Negligible	2 Minor	3 Moderate	4 Major	5 Severe	6 Intolerable
Age/size/sex structure	No interactions leading to change in age/size/sex structure.	No detectable change in age/size/sex structure. Unlikely to be detectable against background variability for this population.	Possible detectable change in age/size/sex structure but minimal impact on population dynamics.	Detectable change in age/size/sex structure. Impact on population dynamics at maximum sustainable level, long-term recruitment dynamics not adversely damaged.	Severe change in age/size/sex structure. Impact adversely affecting population dynamics. Time to recover to original structure up to 5 generations free from impact.	Impact adversely affecting population dynamics. Time to recover to original structure > 10 generations free from impact.
Reproductive capacity	No interactions resulting in change to reproductive capacity.	No detectable change in reproductive capacity. Unlikely to be detectable against background variability for this population.	Possible detectable change in reproductive capacity but minimal impact on population dynamics.	Detectable change in reproductive capacity, impact on population dynamics at maximum sustainable level, long-term recruitment dynamics not adversely damaged.	Change in reproductive capacity, impact adversely affecting recruitment dynamics. Time to recover to original structure up to 5 generations free from impact.	Change in reproductive capacity, impact adversely affecting recruitment dynamics. Time to recover to original structure > 10 generations free from impact.
Behaviour/movement	No interactions resulting in change to behaviour/movement.	No detectable change in behaviour/movement. Time to return to original behaviour/movement on the scale of hours.	Possible detectable change in behaviour/movement but minimal impact on population dynamics. Time to return to original behaviour/movement on the scale of days to weeks.	Detectable change in behaviour/movement with the potential for some impact on population dynamics. Time to return to original behaviour/movement on the scale of weeks to months.	Change in behaviour/movement, impact adversely affecting population dynamics. Time to return to original behaviour/movement on the scale of months to years.	Change in behaviour/movement. Impact adversely affecting population dynamics. Time to return to original behaviour/movement on the scale of years to decades.

Table 4. Consequence ratings for TEP species (continued).

Sub-component	Score/level					
	1 Negligible	2 Minor	3 Moderate	4 Major	5 Severe	6 Intolerable
Interaction with fishery	No interactions with fishery.	Few interactions and involving up to 5% of population.	Moderate level of interactions with fishery involving up to 10 % of population.	Major interactions with fishery, interactions and involving up to 25% of population.	Frequent interactions involving ~ 50% of population.	Frequent interactions involving the entire known population negatively affecting the viability of the population.

Table 5. Confidence scores for consequences.

Confidence	Score	Rationale for the confidence score
Low	1	Data exists, but is considered poor or conflicting. No data exists. Disagreement among experts.
High	2	Data exists and is considered sound. Consensus between experts. Consequence is constrained by logical consideration.

The results of the SICA are documented in the template presented in Table 6.

Table 6. Summary of SICA results template.

Direct impact of Fishing	Fishing Activity	Presence (1) Absence (0)	Spatial scale of Hazard (1-6)	Temporal scale of Hazard (1-6)	Sub-component	Unit of analysis	Operational objective (from S2.1)	Intensity Score (1-6)	Consequence Score (1-6)	Confidence score (1-2)	Rationale
Capture	Bait collection										
	Fishing										
	Incidental behaviour										
Direct impact without capture	Bait collection										
	Fishing										
	Incidental behaviour										
	Gear loss										
	Anchoring/ mooring										
	Navigation/ steaming										
Addition/ movement of biological material	Translocation of species										
	On board processing										
	Discarding catch										
	Stock enhancement										
	Provisioning										

Table 6. Summary of SICA results template (continued).

Direct impact of Fishing	Fishing Activity	Presence (1) Absence (0)	Spatial scale of Hazard (1-6)	Temporal scale of Hazard (1-6)	Sub-component	Unit of analysis	Operational objective (from S2.1)	Intensity Score (1-6)	Consequence Score (1-6)	Confidence score (1-2)	Rationale
	Organic waste disposal										
Addition of non-biological material	Debris										
	Chemical pollution										
	Exhaust										
	Gear loss										
	Navigation/steaming										
	Activity/presence on water										
Disturb physical processes	Bait collection										
	Fishing										
	Boat launching										
	Anchoring/mooring										
	Navigation/steaming										

Table 6. Summary of SICA results template (continued).

Direct impact of Fishing	Fishing Activity	Presence (1) Absence (0)	Spatial scale of Hazard (1-6)	Temporal scale of Hazard (1-6)	Sub-component	Unit of analysis	Operational objective (from S2.1)	Intensity Score (1-6)	Consequence Score (1-6)	Confidence score (1-2)	Rationale
External hazards (specify the particular example within each activity area)	Other fisheries										
	Aquaculture										
	Coastal development										
	Other extractive activities										
	Other non extractive activities										
	Other anthropogenic activities										

Risk classification

Using the Technical Panel’s scoring of consequences and intensities, it is proposed that risk is ranked as a combination of the two scores as illustrated in the risk ranking matrix in Figure 1. Here, ‘intensity’ is a proxy for ‘likelihood’. The risk matrix is used to rank risk in one of five levels, consistent with the approach used in other ecologically sustainable reporting frameworks, and the AS/NZS ISO 31000 standard for risk management (Standards Australia 2009). An explanation of the required management response and reporting requirements is summarized in Table 7.

		Consequence score					
		1	2	3	4	5	6
Intensity score	1	1	2	3	4	5	6
	2	2	4	6	8	10	12
	3	3	6	9	12	15	18
	4	4	8	12	16	20	24
	5	5	10	15	20	25	30
	6	6	12	18	24	30	36

Figure 1. Risk ranking matrix.

Table 7. Risk rankings and expected action.

Risk ranking	Risk outcome	Likely reporting requirements	Likely management response
Negligible	Not an issue.	Minimal.	Nil.
Low	Acceptable; no specific control measures needed.	Justification required.	No specific response.
Medium	Acceptable; with current risk control measures in place (no new management required).	Full performance report.	Specific management and/or monitoring required.
High	Not desirable; continue strong management actions or new and/or further risk control measures to be introduced in near future.	Full performance report.	Increases to management activities needed.
Severe	Unacceptable; major changes required to management in immediate future.	Full performance report.	Increases to management activity needed urgently.

Risk treatment

For any interactions which result in higher levels of risk, and particularly for ‘high’ and ‘severe’ risk rankings, workshop participants are asked to suggest risk treatment measures which might reduce the consequences and/or likelihood scores. These risk treatment measures are recorded as important advice to SFA for consideration, but are not automatically adopted by the fishing industry or government to manage risk in the L&C fishery. The risk analysis is then repeated for the ‘treated risk’ by the Technical Panel, as a reflection of the residual level of risk if the risk treatment measures were in fact adopted. Further consideration of possible risk treatment measures includes feasibility analysis and cost-benefit analysis.

Risk management

Risk management of the L&C fishery involves standardised fishing practices and fishing gear, industry standards and codes of practice, legislation, and research and monitoring of management effectiveness. The MSC Principles and Criteria for Sustainable Fishing set out the standards for the certification program.

MSC Principle 2 for sustainable fishing states:

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Expected outcomes

The desired outcomes of the assessment process are:

- Identification of all relevant technical documents and data underpinning the risk analysis of threats identified in the ERA. The status of the technical information should be documented as peer reviewed, otherwise published, or unpublished work or data.
- Identification and assessment of threats to listed bird species from a comprehensive range of potential interactions with fishing activities.
- Consideration of all planned, contemplated, and suggested risk treatment options for threats which are ranked ‘high’ or ‘severe’. Treated risk is to be analysed and documented to show how effectively risk treatment options would be expected to manage threats.
- Full documentation of the proceedings of the workshop for stakeholder communication and input to the MSC certification process.

References

- Hobday, A.J., A. Smith, H. Webb, R. Daley, S. Wayte, C. Bulman, J. Dowdney, A. Williams, M. Sporcic, J. Dambacher, M. Fuller, T. Walker 2007. *Ecological risk assessment for the effects of fishing: Methodology*. Report R04/1072 for the Australian Fisheries Management Authority, Canberra. Commonwealth Scientific and Industrial Research Organisation, Marine and Atmospheric Division, Hobart.
- PIRSA 2011. *Ecologically Sustainable Development (ESD) risk assessment of the South Australian Lakes and Coorong Fishery*. Draft. Primary Industries and Resources South Australia. March 2011.
- Standards Australia 2009. *Risk management—Principles and guidelines*. AS/NZS ISO 31000:2009. Standards Australia and Standards New Zealand, Sydney.